

mHealth-based Diabetes Prevention Program among Mothers with Abdominal Obesity: A Randomized Controlled Trial

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Abstract : Background: Among people with abdominal obesity, women are more likely to develop diabetes than men. Mothers living with children younger than 18 have more family responsibilities, which limits time and energy to promote their health. mHealth-based technologies provide the flexibility and resource-saving opportunities to improve lifestyles in an individualized way, yet mHealth-based diabetes prevention programs tailored for mothers with abdominal obesity have not been reported. Objectives: The primary objective was to evaluate the feasibility and the acceptability of the program and its preliminary efficacy in reducing weight-related variables and diabetes risk among Chinese mothers with abdominal obesity in 6 months. The secondary objective was to assess the preliminary efficacy of the intervention on glycosylated hemoglobin, behavioral variables, and psychological variables at 6 months. Methods: A randomized controlled trial was conducted at health management centers in two tertiary hospitals in Changsha, China. The mHealth group received 12 weekly online lifestyle modification modules for diabetes prevention and 6 biweekly individualized health messages based on their goal settings and data from a Fitbit tracker. The control group received 12 weekly online general health education, 6 biweekly general health messages, and a Fitbit tracker. Data were collected at baseline, 3 months, and 6 months on feasibility and acceptability outcomes, waist circumference (WC) and body mass index (BMI) of weight-related variables, diabetes risk scores, glycaemic, and behavioral variables (daily steps, active minutes, intake of fruits and vegetables, calorie consumption and sleep duration) and psychological variables (self-efficacy and social support for physical activity and diet and quality of life). Generalized estimating equations were used for data analysis. Results: A total of 80 participants were recruited and randomly assigned to the mHealth group (n=40) or the control group (n=40). The results showed that 85% of participants completed 6 months of follow-up assessments. Regarding the feasibility and acceptance of the mhealth group, the average number of modules reviewed was 7.9 out of 12, and satisfaction score was 4.37 out of 5. Significant improvements at 6 months between the intervention and control groups were found in WC (β -2.24 [95% CI= -4.12 to -0.36] $P=.02$), modifiable diabetes risk scores (β -2.5 [95% CI -4.57 to -0.44], $P=.02$), daily steps (β 1.67 [95% CI= 0.06 to 3.29], $P=.04$), self-efficacy for physical activity (β 1.93 [95% CI= 0.44 to 3.43], $P=.01$), social support for physical activity (β 2.27 [95% CI=0.80 to 3.74], $P=.002$) and physical health satisfaction (β 0.82 [95% CI=0.08 to 1.55], $P=.03$). No differences were found in BMI, total diabetes risk score, daily active minutes, daily intake of fruits and vegetables, sleep duration and daily calorie consumption, self-efficacy, and social support for diet ($P>.05$). Conclusions: The tailored mHealth-based lifestyle intervention is feasible and acceptable among Chinese mothers with abdominal obesity. The preliminary efficacy of this intervention is promising as it has significantly improved WC and physical activities along with the quality of life-related to physical health. This approach may offer a flexible, tailored and resource-saving model to deliver diabetes prevention programs among busy mothers with abdominal obesity. Future studies need to explore ways to improve dietary behaviors and the long-term efficacy of this intervention.

Keywords : type 2 diabetes, mHealth, obesity, prevention, mothers

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