My Wellness Coach: Evaluation of a Mobile App Designed to Promote Integrative Health among Underserved Populations

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This project was supported by funds from the David and Lura Lovell Foundation, Grace US Foundation, Black Family Foundation, Karen J Lytle, and Karen Malkin Health Counseling.

Abstract:

Background: Underserved populations, including those from racial and ethnic groups and with low socioeconomic status, often lack access to mobile apps aimed at reducing health risk factors. **Purpose:** This study evaluated the feasibility, acceptability, and preliminary effectiveness of the mobile app, *My Wellness Coach (MWC),* designed to promote behavior change in seven core areas of integrative health among underserved populations. **Methods:** Patients and staff were recruited from clinic and other settings. Some participants used *MWC* in a weekly group setting (n=5); others on their own with support from a coordinator (n=36). Health outcomes were assessed at baseline and 3-months. Mobile app ratings were collected at 5 weeks and 3-months. Goal setting data were analyzed at 3-months. **Results:** Most participants (76%) set at least one goal, 71% created action steps for goals, and 29% completed a goal. Patients in the group setting had the highest rate of goal completion (60%) compared to patients (20%) and staff (27%) using the app on their own. Significant ($P<0.05$) changes in pre-and post-test scores were documented for overall wellbeing, global physical health, BMI, vigorous physical activity, and eHealth literacy. Most participants (75-91%) gave *MWC* high ratings for impact on behavior change, help seeking, intent to change, attitudes, knowledge and awareness. **Conclusion:** This study documented preliminary evidence of the potential benefits of *MWC* among underserved communities. Future evaluations of Spanish and Android versions and comparisons between group and individual administration will inform implementation strategies for scaling *MWC*-based interventions to reach underserved communities nationally.

Keywords: mHealth, mobile app, integrative health, underserved populations

Lay Summary:

Many underserved populations, including those from diverse racial and ethnic groups and with low income, do not have access to mobile apps to improve health. This study examined whether using the *My Wellness Coach* (*MWC*) app was feasible, acceptable and effective. *MWC* was designed to promote behavior change in integrative health (Movement, Nutrition, Spirituality, Resilience, Relationships, Sleep, and Environment) among underserved populations. Five participants used *MWC* in a group setting and 36 participants used *MWC* on their own with assistance from a coordinator. Participants completed surveys at the beginning of the study and 3-months later. Most participants (76%) set at least one health goal, 71% created action steps for goals, and 29% completed a goal. Participants who used *MWC* with the weekly group had the highest rate of goal completion (60%). Participants reported significant changes in wellbeing, physical health, body mass index, physical activity, and ability to find and understand electronic health information. Most participants (75-91%) gave *MWC* positive ratings. This study provided evidence of the potential benefits of *MWC* among underserved communities. Future studies with Spanish and Android versions and comparisons between group and individual administration will inform strategies for expanding the reach of *MWC*-based interventions to underserved communities.

Chronic diseases are major contributors to mortality and morbidity in the U.S.[1]. Six in ten adults have a chronic disease and four in ten adults have two or more diseases [1]. Chronic disease burden is heightened among some underserved and disadvantaged populations, including those from racial and ethnic groups and with low socioeconomic status. Researchers have documented racial/ethnic disparities in hypertension with significantly higher prevalence among African American adults compared to White adults [2]. There are also racial/ethnic and socioeconomic disparities in prevalence and incidence rates of diabetes among U.S. adults [3]. This research is supported by studies on the social determinants of health defined by the Centers for Disease Control and Prevention as “conditions in the places where people live, learn, work, and play that affect a wide range of health and quality-of-life-risks and outcomes” [4]. An investigation with adults at high risk of knee osteoarthritis found that unemployment was associated with increased odds of having arthritis, cancer, chronic obstructive pulmonary disease, and heart attack [5].

Many chronic diseases may be prevented with health behaviors, such as having a healthy diet and maintaining an active lifestyle [1]. The rise in smartphone ownership among U.S. adults has increased opportunities for using mobile apps to reduce chronic disease risk factors and promote behavior change. In 2018, 96% of U.S. adults reported owning some type of mobile phone with most (81%) owning smartphones [6]. There are, however, concerns about the potential disparities in technology adoption, often referred to as the "digital divide" [7]. One survey found that 29% of U.S. adults with household incomes below $30,000 do not own a smartphone compared to 3% of adults with household incomes of $100,000 or greater [8]. Only 36% of adults with household incomes below $30,000 owned tablets compared to 70% of adults with household incomes of $100,000 or greater. However, the survey findings revealed that lower-income U.S. adults were more dependent on smartphones for internet access. Other research showed that many low-income, racial and ethnic minority patients do not use their smart phones to full capability, but that there was an age difference [7]. Age was significantly associated with the use of smartphones for Internet browsing, social media, and apps, with younger smartphone-owing participants engaging in those phone activities more often. Another study with an urban, underserved minority sample found that the majority (73%) reported an interest in using apps to manage health [9]. This latter finding suggests that health promotion apps may play an important and inexpensive approach for disseminating information to underserved populations to mitigate chronic disease risk factors [10].

There are several systematic reviews on the effectiveness of mobile apps for behavior change and health. Payne and colleagues [11] documented high user acceptability of mobile apps across studies but mixed findings related to the impact of apps on health behaviors and health outcomes. The review, however, was limited to small sample pilot and feasibility studies. A

more recent systematic review with health promotion programs using mobile apps found that health outcomes were better among mobile app users compared to non-users in the general population [12]. The only review on the effectiveness of mHealth technology with underserved and minority populations found that most studies focused on the use of telephone text messaging, revealing a need for more research on the use of mobile apps with those populations [13].

The *My Wellness Coach (MWC)* mobile app was developed by the University of Arizona Andrew Weil Center for Integrative Medicine (AWCIM) as an integrative lifestyle change tool for underserved communities. Integrative medicine, as defined by AWCIM, is healing-oriented medicine that considers the whole person, including every aspect of lifestyle. It focuses on the therapeutic relationship between practitioner and patient, is informed by evidence, and uses a variety of appropriate therapies [14, 15].

MWC promotes behavior change in seven core areas of integrative health identified by AWCIM, including Movement, Nutrition, Spirituality, Resilience, Relationships, Sleep, and Environment [16]. The app applies principles of integrative health coaching, motivational interviewing, and goal setting strategies to tailor to individual needs and strengths. Integrative health coaching applies several health behavior change theories including the Health Belief Model [17], Theory of Planned Behavior [18], and Transtheoretical Model [19]. *MWC* is written at a 5th grade-reading level and contains information on current guidelines, recommended practices, and available resources. *MWC* has interactive components emphasizing individual values, strengths, and motivators. The app facilitates the process of creating individualized SMART (specific, measurable, achievable, relevant, timely) lifestyle behavior change goals that may be achieved within 12-weeks. Individuals may use *MWC* to track progress on their goals using action steps and reminder notifications.

The goal of *MWC* is to increase accessibility to integrative health among underserved populations. To increase accessibility, *MWC* was designed to limit data needs and Wi-Fi connection. Individuals with smart phones, who do not have data or internet access, are still able to use the app after it is installed and they are logged on. All functions of the app can be accessed offline except for links to external resource websites. The purpose of the current study was to evaluate the feasibility, acceptability, and preliminary effectiveness of *MWC* mobile app among adults recruited from underserved community settings. At the time of this study, *MWC* was only available in English and for iOS mobile devices. It is currently available in Spanish and for Android mobile devices.

Methods

Participants

This study involved collaborations with community partners. One partner was El Rio Health (El Rio), a federally-qualified health center that provides healthcare to more than 107,000 patients in Tucson [20]. Recruitment strategies included presentations at staff meetings, tabling at clinics, staff referrals, flyers, and word of mouth. El Rio patients recruited for the study were given the option to use *MWC* in a weekly group program held at El Rio or on their own with support from a study coordinator. El Rio staff members were also eligible to participate and were recruited using email invitations. The second community partner was the Southern Arizona AIDS Foundation (SAAF). SAAF provides case management and ancillary support services for people living with HIV/AIDS and their families and HIV/AIDS prevention, education and outreach in Southern Arizona [21]. SAAF preferred to have their staff use *MWC* before introducing it to their clients. Inclusion criteria consisted of being an English speaker, having an iPhone, and having a current email address.

The total sample of 41 participants consisted of 5 individuals who used *MWC* in weekly groups held at El Rio and 36 individuals who used it on their own with support from a study coordinator. Among the group of 36 individuals, 24 were El Rio patients, 7 were El Rio staff, 4 were SAAF staff, and 1 was the spouse of a staff person.

Procedures

The weekly group program offered at El Rio consisted of thirteen 90-minute sessions. The program was conducted by a health coach facilitator implementing a structured curriculum. The sessions included onboarding the mobile app, training with *MWC*, group coaching, education on the 7 core areas of integrative health, homework exercises, and evaluation activities. Individuals using *MWC* on their own met with a study coordinator at baseline for onboarding the mobile app and completing the baseline survey; at week 5 they met to answer questions and complete a user satisfaction survey; and at week 12 to complete posttest surveys. The participant and study coordinator met at the El Rio clinic or a location chosen by the participant. Study participants received an incentive for completing the surveys. A user satisfaction survey was administered at 5- and 12-weeks. IRB approvals were obtained from the University and El Rio Health.

Measures

Demographic information included age, gender, ethnicity, race, education, military service, zip code, primary language, work status, income, health insurance, access to healthcare, medical conditions, and health and fitness mobile app experience.

Health literacy was measured with two items: 1) ability to read written material from doctor or pharmacy [22, 23], 2) confidence filling out forms by yourself. Items were rated from 0 (never) to 4 (always) [22, 23]. E-health literacy was assessed using the eHealth Literacy Scale

(eHEALS), consisting of 8 items that measure consumer comfort and skill in using information technology of health [24]. Items were rated from 1 (strongly disagree) to 5 (strongly agree).

Several instruments were used to measure well-being. The WHO-5 Well-Being Index assessed subjective psychological well-being in the past 2 weeks, using five items rated on a scale from 0 (none of the time) to 5 (all of the time) [25]. The 100 Million Lives Adult Wellbeing Assessment consisted of 7 items that measured current and 5-year wellbeing, financial wellbeing, physical and mental health, social and emotional support, and purposeful and meaningful life [26]. Four subscales from the Psychological Wellbeing Scale were used [27, 28]. Twelve items assessed personal growth, positive relations with others, purpose in life and self-acceptance and were rated on a scale from 1 (strongly disagree) to 6 (strongly agree).

The Dispositional Resiliency Scale was used to measure personality hardiness, a personality style tied to resilience, good health and responses to stressful conditions [29, 30]. The three subscales were control (ability to influence one's own destiny), challenge (zest for life leads to perceiving change as an exciting), and commitment (sense of meaning and purpose in one's existence encompassing self, work, others). Items were rated on a 4-point scale with higher scores indicating greater resiliency.

Lifestyle behaviors, environmental health, and household clutter were assessed using validated instruments. The Arizona Lifestyle Inventory consisted of 74 items that assessed the frequency of lifestyle behaviors in the past 7 days in the areas of: nutrition/diet; physical activity; spiritual/mind-body practices; relationships; sleep; and work stress [31]. Items were rated on a scale from 0 days to 7 days. Health status items included medical condition, medication to treat medical condition (yes/no), BMI, and days with pain. The Environmental Health Assessment Scale consisted of 19 items that measured exposure to common chemicals related to food,

cooking and food storage items, chemical exposure, cleaning products and tobacco smoke exposure [32]. Response options included regularly, sometimes, or never. The Hoarding Assessment Tool had 5 items that assessed self-perceived problem with clutter, other perceived problem, interference with room use, distress clearing clutter, and problem collecting/buying [33].

Quality of the app was measured using the Mobile Application Rating Scale [34, 35]. Six items measured the impact of the app on knowledge, attitudes, and intention related to the target health behavior. Twenty items assessed subjective quality including engagement, functionality, aesthetics, information quality and overall assessment of app. Items were rated on a 5-point scale from 1 (least favorable) to 5 (most favorable). Utilization data were collected by the app and included number of goals set, goal area, goal attainment, number of action steps, and action step completion.

Analyses

The sample sizes were small for both the group of individuals who used *MWC* in weekly group sessions and on their own; therefore, data from both groups were combined for the analyses. Descriptive statistics are presented for demographic characteristics, user satisfaction, and *MWC* app utilization results. Paired t-tests were conducted to assess pre-post changes on outcome measures. Chi-square analyses were conducted on the categorical measures. T-tests were conducted to compare non-staff and staff participants on the MARS posttest ratings. Analyses were conducted using IBM® SPSS® Statistics Desktop V25.0 (Armonk, New York).

Results

Participant characteristics

The average participant age was 45.4 with a range of 18-75 years old. More than half of the participants were female (n=30/40; 75%), White (n= 21/36; 58.3%), and single (n=26/41; 63.4%); while almost half were Hispanic (n=19/40; 47.5%). Over a third reported having a Bachelor's degree or higher (n=15/41;36.6%). Almost half were employed full-time (n=20/41; 48.8%). Many individuals reported experience using health or fitness mobile phone apps (n=20/41; 48.8%) and activity tracking devices (n=19/41; 46.3%). Five individuals did not complete the 12-week follow-up assessment. The five individuals all had used *MWC* on their own with the support of a study coordinator.

Goal setting

Table 1 presents the creation and completion of goals and action steps by group. A majority of participants (n=31/41; 76%) set at least one goal using the app, with an average of 1.5 goals per participant (range 1-4 goals). All group participants and most (92%) staff set a goal. Almost one-third of participants with goals completed their goals (n=9/31; 29%). Examples of goals that were created and completed included "I plan to start eating healthier" and "I will start to lose weight and eat more healthy." Group participants had the highest goal completion rate (n=3/5; 60%). Of the 45 goals created, a majority were in Movement (n=13/45; 29%), followed by Nutrition (n=11/45; 24%) and Sleep (n=7/45; 16%). Fewer goals were set in Relationships (n=4/45; 9%), Resilience (n=4/45; 9%), Spirituality (n=3/45; 7%) and Environment (n=3/45; 7%). Among the 45 goals, one-third of them were achieved (n=16/45; 36%). Most users (n=29/41; 71%) created action steps toward their goals. A total of 285 action steps were created by participants with 62% of the action steps reported as completed (n=177/285).

Impact on health and wellbeing

Pre-post changes in outcome variables are presented in Table 2. A statistically significant improvement was observed for eHealth literacy (P<0.001**)**; however, health literacy showed no change. In terms of overall wellbeing, statistically significant improvements were observed for 2 of the 100 Million Lives Assessment items: physical health (P=0.003) and leading a purposeful and meaningful life (P=0.007). No changes were observed for the other wellbeing measures. Statistically significant improvements were observed for several health status items: BMI decreased (P=0.022), the number reporting medical conditions (P<0.001) and medications decreased (P=0.002), and days with pain decreased (P=0.042). Improvements were observed for days socializing (P=0.004), feeling a sense of belonging to a community (P<0.001), time engaged in vigorous physical activity (P=0.008), restful sleep days (P=0.009), drinking tea (P=0.004), and days feeling overwhelmed at work decreased (P=0.037). Findings with the Environmental Health Assessment were non-significant. For the hoarding assessment, there was a statistically significant increase in others perceiving a clutter problem (P=0.043) and an improvement in problems collecting/buying (P=0.006).

Mobile app quality

MWC app ratings as presented in Table 3 were consistent between week 5 and posttest with the exception the Engagement scale which decreased at posttest (P=0.006). Overall assessment items were also analyzed individually. Ratings were consistent over time with the exception of willingness to pay for the app which decreased at posttest (P=0.04). T-tests comparing MARS ratings at posttest between staff and non-staff were non-significant.

Discussion

Based on self-report and app utilization data, this study documented preliminary evidence and some noteworthy findings regarding the feasibility, acceptability and effectiveness of *MWC*

among underserved populations. A small sample of patients and staff used the app for 3 months and a majority of them (76%) set at least one goal. One third (35%) of the goals were achieved during the study period. Most of the goals focused on two core areas of integrative health, Movement and Nutrition. Data about reasons for selecting a particular core area were not collected. It was possible that participants focused on Movement and Nutrition because they were well-known areas for behavior change. This may be driven by the incidence of obesity in the U.S. and frequent messaging through marketing ads, television programs and social media regarding the use of exercise and diet to address healthy fitness and weight. Individuals who want to improve their health often seek strategies for increasing physical activity and/or improving diet [36]. Individuals may be less familiar with or uncertain about making behavior changes in other areas of integrative health, such as Spirituality and Environment. Goal-setting behaviors also revealed potential differences between participants who used *MWC* in a group setting compared to those who used it on their own. The participants in the group might have created and completed more goals compared to those who used *MWC* on their own because of increased external accountability and support in the group settings. Researchers who conducted a qualitative study on perceptions of mobile apps for smoking cessation highlighted a need for external accountability during a quit attempt and concerns that a mobile app would not be able to provide it [37].

The app was acceptable with a majority of participants reporting satisfaction with *MWC.* Most individuals (75-91%) gave the app high ratings on several criteria including impact on behavior change, help seeking, intent to change, attitudes, knowledge and awareness. One area of potential weakness was a significant decrease in engagement of the app between the two assessment periods (3.67 versus 3.39 out of 5.0). One reason may be as participants completed

their goals; they did not perceive a need for continued engagement. Yet there may remain other integrative health areas where change may be beneficial. Participants may have less knowledge or experience setting goals related to Resilience and Sleep. Lack of user engagement in health apps is a common concern. Many individuals who download an app will not use them repeatedly with only 16% using an app a third time [38]. A study on user engagement of a weight loss app found that the most engaged group of participants customized recipes and exercises and utilized more custom features of the app compared to the less engaged group [39]. Future MWC versions should increase customization opportunities and promote exploration and engagement in all core areas of integrative health.

Among the 36 participants who completed both the baseline and the 12-week follow-up assessments, there was documented effectiveness of the app in promoting changes in a variety of health and health behaviors. Some noteworthy findings were significant improvements in self-reported physical health, decreases in BMI, and increases in time engaged in vigorous physical activity. Those findings were consistent with previous research that showed that a mobile app produced significant changes in physical activity [40]. Significant changes were also documented for outcomes related to other core areas that were promoted by *MWC*, including Sleep and Relationships, even though goals were not often created in those areas. There were significant improvements in days of restful sleep between baseline and the 12-week follow-up assessment. The findings were noteworthy because research on sleep remains limited. A scoping review on the use of mobile apps on combined interventions on physical activity, diet, and sleep found that sleep behavior was rarely targeted in combination with other health behavior change [41]. The current study also found significant increases in days socializing and feeling a sense of belonging to a community. Similar to sleep, there are few past studies on the role of mobile apps for

improving relationships and building community. An app-based intervention for workplace stress found no effects on social community at work [42]. A study on adolescents' perspectives revealed that most adolescents would be open to using a mobile help-seeking intervention for relationship problems and help [43]. That research suggests there is a need to investigate the benefits of integrative health mobile apps that include relationships among the areas for healthy behavior change.

Of relevance to underserved populations who own smart phones, the current study documented significant improvements in eHealth literacy. eHealth literacy is the ability to read, use computers, search for information, understand health information, and put it within context [44]. Research has shown the importance of eHealth literacy related to internet information consumption and outcomes from the information search [45]. Individuals who were more e-Health literate benefited more from their information search. The information search improved their ability to self-manage their health care needs, affected their health behaviors, and allowed them a better use of their health insurance [45]. Thus, *MWC* may serve as a tool to enhance how underserved individuals use their smart phones to improve their health.

There were several study limitations. Because of the small sample size, some analyses were not feasible, such as analyses to determine associations between personal characteristics and use of the app and outcomes. If future research shows that some personal characteristics, such as age, are associated with app use, then *MWC* may need to be tailored for users of different ages. The sample also had limited diversity because participants were primarily female and single. The study also only collected self-report data. Responses to questions about health and well-being and lifestyle behaviors might have been subjected to self-report bias. In addition, the study did not control for participant experiences with other health interventions, mobile apps,

and tools and did not exclude individuals based on such experiences. The study was unable to determine if the effectiveness of *MWC* was different if it was used alone or in combination with other health interventions.

Consistent with researchers' recommendations for app-based intervention research [11], rigorous randomized controlled trials with *MWC* with adequate sample sizes are needed. Large samples of participants may be recruited with partnerships with community health centers and businesses. Recent development of Spanish and Android system versions of *MWC* will help establish such partnerships because their patients or employees may prefer those versions. Community partnerships may provide opportunities for evaluation of the impact of *MWC* when the app is incorporated in existing health promotion and wellness programs. Those opportunities will facilitate further study of comparisons between group and individual administered *MWC* to determine the impact of group settings on health outcomes. In addition, large studies with underserved populations should consider focusing on chronic health conditions and include assessment of biological outcome data. Researchers recommended that all chronic health conditions reported by underserved populations would benefit from mHealth interventions [13]. A systematic review showed that 50% of mHealth interventions for diabetes treatment and management reported statistically significantly improved results in primary outcomes or clinical biomarkers, such as blood glucose, HbA1c, and blood lipids [46]. Future research should also focus on strategies to increase engagement with multiple core areas of the app in order to achieve the benefits of integrative health, especially among populations who may be less familiar with integrative health.

The current study showed that *MWC* is a promising health app that promotes behavior change among adults from underserved populations. Future investigations will inform effective

strategies for implementation and scaling of *MWC* app interventions to achieve the ultimate goal of increasing accessibility of *MWC* among underserved communities nationally.

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Table 1. Creation and Completion of Goals and Action Steps by Group

Group		**Participants Set Goals**		**Participants Completed Goals**		**N Goals Set**	**N Goals Completed**		**Participants Set Steps**		**Participants Completed Steps**		**N Steps Set**	**Steps Completed**	
	N	**N**	**%**	**N**	**%**	**N**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**N**	**%**
El Rio-Group	5	5	100%	3	60%	6	4	67%	5	100%	4	80%	25	21	84%
Individual	24	15	63%	3	20%	23	7	30%	14	58%	11	79%	203	131	65%
Staff	12	11	92%	3	27%	16	5	31%	10	83%	7	70%	57	25	44%
Total	**41**	**31**	**76%**	**9**	**29%**	**45**	**16**	**36%**	**29**	**71%**	**22**	**76%**	**285**	**177**	**62%**

Table 2. Pre-Post Changes in Outcome Measures

Measure	**N**	**Pretest**	**Posttest**	**T/X (df)**	**Sig**
		Mean (SD) /N(%)	**Mean (SD) /N(%)**		
eHeals	36	30.75(5.4)	35.5 (3.7)	-5.96 (35)	**<0.001**
Need help reading written material from doctor or pharmacy	36	0.78 (0.9)	0.67 (0.9)	0.70 (35)	0.49
Confident filling out forms by yourself	36	3.61 (0.9)	3.44 (1.0)	1.0 (35)	0.32
WHO-5	36	61.44 (21.4)	66.44 (21.2)	-1.39 (35)	0.172
100 Million Lives					
Where on the ladder personally stand now	36	6.83 (1.9)	7.39 (1.5)	-1.82 (35)	0.077
Which step stand on five years from now	36	8.81 (1.2)	8.81 (1.2)	0 (35)	1.000
Financial ladder personally stand right now	35	5.74 (2.6)	6.43 (2.5)	-1.92 (34)	0.063
How would rate your physical health	36	3.08 (1.0)	3.44 (1.1)	-3.17 (35)	**0.003**
How would rate your mental health	35	3.43 (1.1)	3.66 (1.0)	-1.49 (34)	0.147
Get the social and emotional support needed	36	3.81 (0.9)	4.03 (0.9)	-1.48 (35)	0.147
I lead a purposeful and meaningful life	36	5.67 (1.4)	6.17 (0.8)	-2.84 (35)	**0.007**
Psychological Wellbeing Scale					
Personal Growth	35	16.60 (1.9)	16.23 (2.4)	0.81 (34)	0.422
Positive Relations with Others	35	14.63 (3.0)	14.80 (3.2)	-0.29 (34)	0.772

Measure	**N**	**Pretest**	**Posttest**	**T/X (df)**	**Sig**
		Mean (SD) /N(%)	**Mean (SD) /N(%)**		
Purpose in Life	35	13.83 (2.5)	13.37 (2.6)	0.92 (34)	0.363
Self-acceptance	35	14.2 (2.9)	14.20 (3.1)	0 (34)	1.000
Dispositional Resiliency Scale Total	36	33.47 (5.3)	33.61 (4.4)	-0.17 (35)	0.866
Control	36	13.44 (2.3)	13.28 (2.2)	0.35 (35)	0.726
Challenge	36	10.36 (2.3)	10.11 (2.2)	0.91 (35)	0.368
Commitment	36	10.67 (3.0)	11.23 (2.3)	-1.27 (35)	0.212
Arizona Lifestyle Inventory					
BMI	30	30.14 (6.9)	29.14 (6.4)	2.43 (29)	**0.022**
Have medical condition (yes)	36	21 (58.3%)	17 (47.2%)	23.01 (1)	**<0.001**
Medication for medical condition (yes)	35	21 (60%)	16 (45.7%)	0.46 (1)	**0.002**
Days physical pain	34	2.41 (2.5)	1.88 (2.3)	2.11 (33)	**0.042**
Tea - Average drinks per day (caffeinated)	33	1.06 (1.6)	1.70 (1.8)	-3.06 (32)	**0.004**
Days socializing	36	2.53 (1.8)	3.36 (2.2)	-2.65 (35)	**0.012**
Sense of belonging to a community (yes)	32	24 (75%)	27 (84%)	26.0 (4)	**<0.001**
Time in vigorous activity	23			17.30 (6)	**0.008**
Less than 2 hours		18 (78.3%)	13 (56.5%)		
2-4 hours		3 (13%)	6 (26.1%)		
5-7 hours		2 (8.7%)	3 (13.0%)		
8-10 hours		0 (0%)	1 (4.3%)		
Days outdoors	35	3.66 (2.6)	3.0 (2.2)	1.71 (34)	0.097

Measure	**N**	**Pretest**	**Posttest**	**T/X (df)**	**Sig**
		Mean (SD) /N(%)	**Mean (SD) /N(%)**		
Days restful sleep	35	3.4 (2.5)	4.46 (2.2)	-2.75 (34)	**0.009**
Days herbal products for sleep	33	1 (2.2)	0.45 (1.6)	1.89 (32)	0.068
Days overwhelmed at work	26	2.58 (2.4)	1.54 (1.5)	2.20 (25)	**0.037**
Environmental Health Assessment					
Food	35	6.03 (1.3)	6.23 (1.6)	-0.82 (34)	0.421
Storage	35	9.11 (2.5)	9.37 (2.4)	-0.68 (34)	0.502
Chemical Exposure	36	4.69 (1.2)	4.44 (1.2)	1.20 (35)	0.238
Cleaning Products	36	7.22 (2.0)	7.56 (2.3)	-1.22 (35)	0.230
Tobacco Smoke Exposure	36	10.44 (2.2)	10.61 (2.0)	-0.71 (35)	0.481
Hoarding Assessment					
Self-perceived problem clutter (number, % yes)	35	16 (45.7%)	12 (34.3%)	1.17 (1)	0.279
Other-perceived problem clutter (number, % yes)	35	10 (28.6%)	12 (34.3%)	4.11 (1)	**0.043**
Interference room use	36	0.31 (0.6)	0.47 (0.7)	-1.18 (35)	0.245
Distress clearing clutter	35	0.69 (0.9)	0.94 (1.0)	-1.51 (34)	0.141
Problem collecting/buying	36	0.53 (0.6)	0.25 (0.4)	2.94 (35)	**0.006**

Table 3. Change in MARS ratings – Week 5 & Posttest

Scale	**N**	**Week 5**	**Posttest**	**Sig**
Engagement	32	3.67	3.39	**0.006**
Functionality	32	3.84	3.84	1
Aesthetics	32	3.80	3.86	0.553
Information	32	4.27	4.17	0.256
App Quality	32	3.89	3.82	0.203
Perceived Impact	32	4.23	4.27	0.822
Overall Assessment Scale	32	3.57	3.47	0.328
Would you recommend this app?	32	4.13	4.09	0.856
How many times do you think you would use this app?	32	3.84	3.66	0.325
Would you pay for this app?	32	2.66	2.25	**0.04**
What is your overall rating of the app?	32	3.66	3.88	0.109