USING GOAL SETTING AND ATTAINMENT TO IMPACT INDICATORS OF HEALTH BEHAVIOR CHANGE AMONG YOUNG AMERICAN INDIAN WOMEN: THE WE RISE (RAISING INCOME, SUPPORTING EDUCATION) STUDY

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Abstract: The purpose of the present study was to assess the association between setting and attaining goals and indicators of health behavior change (psychological general well-being index, self-efficacy, and health locus of control) among young American Indian mothers. A total of 60 women were randomized to either intervention or control. At the end of the 6-month intervention, goal attainment was not significantly associated with the three outcomes of interest. However, resource program contacts and goal track were associated with confidence in completing goals and health locus of control internality, respectively. Lessons learned and future research needs are discussed.

INTRODUCTION

Among both male and female American Indians and Alaska Natives (AI/ANs) across the United States, death rates are approximately 46% higher than Whites (Espey et al., 2014). This is strikingly higher in the Northern Plains, where all-cause mortality is 89% higher among AI/AN males than White males, and 92% higher among AI/AN females than White females (Espey et al., 2014). While decreases in all-cause mortality have been seen among Whites over the past two decades, these decreases have not been seen in the AI/AN population (Espey et al., 2014). The top five leading causes of death among males include heart disease, cancer, accidents, diabetes mellitus, and chronic liver disease, and among females include cancer, heart disease, accidents, diabetes mellitus, and stroke (Espey et al., 2014). Tobacco use, alcohol use, obesity, inactivity, metabolic syndrome, and access to care all contribute to mortality and disparities in mortality between AI/ANs and Whites (Espey et al., 2014).

In addition to individual health behaviors, it is well-documented that socioeconomic status, specifically income and education, is associated with health disparities, especially in minority

populations such as AI/ANs (Robert Wood Johnson Foundation, 2009). These social determinants of health, including income, education, and occupation, are not directly affecting health, per se, but are serving as proxies for other determinants of health (Angell, 1993). Previous research supports that changes in these three factors can lead to positive health behaviors for individuals and potentially their young children (Hanson & Pourier, 2015; Pampel, Krueger, & Denney, 2010). Interventions with potential for the greatest impact are those that address social determinants of health (Galea, Tracy, Hoggatt, Dimaggio, & Karpati, 2011). It is important to give priority to interventions focusing on the health of women of child-bearing age and children to minimize the impact of inequality early on in life (Adler & Newman, 2002). Effective interventions are needed to improve socioeconomic status and reduce the burden of health disparities in Indian Country and should build upon existing frameworks of support.

The goal of the Collaborative Research Center for American Indian Research (CRCAIH) is to "improve AI health through examination of social and environmental influences on health" (CRCAIH, n.d.). More specifically, CRCAIH aims to facilitate and support the development of relationships between tribes and researchers in this space, and to fund pilot work addressing regional AI health issues (CRCAIH, n.d.). Through these efforts, local research professionals from a tribal community and faculty from an 1862 land-grant university were able to build upon existing work and leverage strengths and knowledge to develop and test an innovative intervention intended to tackle underlying factors contributing to health disparities among AIs, while promoting existing community resources and programs.

The We RISE (Raising Income, Supporting Education) Study aimed to improve socioeconomic factors in young AI mothers with an intervention that encouraged setting and attaining goals related to income, occupation, or education, as well as utilization of community resources. The goal of We RISE was to impact beliefs and, ultimately, behaviors related to health, such as locus of control, general well-being, and self-efficacy. Therefore, the purpose of the present study was to assess the association between setting and attaining income-, occupation-, and education-related goals and indicators of health behavior change among young AI women.

METHODS

This randomized controlled trial consisted of an intervention where participants worked with a trained mentor (research staff) to set and attain a goal related to either income (i.e., personal

finance), occupation (i.e., job skills), or education (i.e., advancing education). Additionally, participants utilized a community program from a study-developed resource guide, which contained a brief description of resources available locally, plus contact information. This resource guide was developed in consultation with program representatives from within the community, some of which participated in a study-sponsored poverty and culture training (see O'Leary et al., 2019, in this special issue). Outcomes of interest in the present study included psychological general well-being, self-efficacy, and health locus of control. Study participants provided written consent, and all protocols and procedures were approved by the South Dakota State University Institutional Review Board. Local and regional tribal approval was also obtained.

Participants

To estimate a correlation coefficient of $r = 0.265$ between the intervention groups and the primary and secondary outcome measures with 80% power and a significance level of $\alpha = 0.05$, 60 individuals needed to be recruited ($n = 30$ in each group). Women were eligible for the study if they met the following inclusion criteria: 1) aged 18-30 years, 2) enrolled tribal members, 3) high school graduates, 4) have custody of and living with a child aged 0-12 years, and 5) interested in setting a goal related to job skills, education advancement, or personal finance. Women were not eligible for the study if they had a cognitive disorder impairing them from completing the intervention, if they planned to move out of the area during the study, or if a member from their household was already participating in the study. Participants were recruited through public advertising (including social media), Women Infant and Children (WIC) offices, social service offices, and health care providers in local communities. Participants that met the inclusion criteria and signed the informed consent were randomized to either the intervention or control group using a random number generator that linked participant ID with study group assignment.

Study Design

All participants completed data collection at baseline and six-months post-baseline. At these two study visits, data collection included a questionnaire and brief physical assessment. The questionnaire captured demographics and medical history (Centers for Disease Control and Prevention, 2016) and information related to outcomes of interest. Outcomes of interest included the psychological general well-being index (PGWBI), which was used to determine perceived

general well-being (Chassany, Dimenäs, Dubois, Wu, & Dupuy, 2004) and has been deemed valid and reliable among Northern Plains AIs (Leonardson, 2003). The PGWBI provides a global score (0 to 110) in addition to several sub-scales, including anxiety, depressed mood, positive well-being, self-control, general health, and vitality (Chassany et al., 2004). Self-efficacy encompassed both importance of setting goals and confidence in goal attainment and was assessed using a modified version of a readiness ruler, originally used to determine importance of and confidence in change behavior (Center for Evidence-Based Practices, 2010). Health locus of control was assessed using the Multidimensional Health Locus of Control Scale (Wallston, 2005), which has been used in AI populations previously (Egan et al., 2009) to capture scales for internal, chance, and powerful others. Additionally, height (to the nearest 0.5 cm), weight (to the nearest 0.1 kg), and blood pressure were measured and recorded by trained study personnel.

At the baseline visit, intervention participants also completed a session with a study mentor that included goal setting and developing an action plan. The mentor used motivational interviewing techniques (Miller & Rollnick, 1991) to facilitate an exploration of goals related to education advancement, finances, and job skills and guided participants in choosing a goal that was of interest to them and that would provide the most personal benefit. Education advancement goals included things such as completing college admission paperwork or attaining perfect attendance and a specific grade point average in college courses. Financial goals included reducing debt or starting a savings plan. Examples of occupation-related goals included creating a resume or attaining a certification, such as Certified Nursing Assistant. Intervention participants evaluated attainment of their goal during their final visit.

Two additional study visits occurred at 2- and 4-months post-baseline for intervention participants. At these visits, participants met with a mentor to monitor and document progress toward their goal and make necessary revisions to their action plan. If barriers were encountered, the mentor would use motivational interviewing techniques to help the participant make a plan to overcome barriers. No physical assessments were completed during these visits. Data on goal progress, frequency of resource program contacts, and frequency of support person contacts were collected.

Monetary incentives were provided for completion of study visits. Study participants received $25 per visit for completion of the baseline and final visit. Individuals in the intervention also received $25 per visit for the completion of study visits at 2- and 4-months post-baseline.

RESULTS

All analyses were conducted using Stata version 14.2 for Windows. Differences in demographics between intervention and control groups were examined using independent t-tests (continuous variables) and chi-squared tests of independence (categorical variables). Regression analyses were used to examine associations between independent variables and the outcomes of interest. Linear regression was used to determine the association between intervention status and indicators of health behavior change outcomes of interest (perceived general well-being, self-efficacy, and health locus of control), while controlling for baseline value of the outcome. Similarly, linear regression was used to determine the association between indicator of health behavior change outcome of interest and aspects of the intervention (including goal attainment, contacts, and goal track).

Table 1
Study participant demographics at baseline (mean ± SE)

	Control $n = 30$	Intervention $n = 30$	p-value
Age (y)	25.7 ± .49	25.9 ± .57	.75
Married (no/yes)	21/9	18/11	.52
Education (HS/HS+)	11/18	15/15	.35
Taking Classes (no/yes)	23/7	23/7	1.0
Employed Full-time (no/yes)	14/16	19/11	.19
Annual Household Income (<6k, 6k+)	12/18	8/22	.27
Social Readjustment Rating Scale	441 ± 151	503 ± 134	.76
Hierarchy of Needs Assessment			
Deficiency Motivators (0-4)	2.5 ± .27	3.0 ± .22	.11
Growth Motivators (0-4)	2.4 ± .24	2.9 ± .23	.17
Total score (0-8)	4.9 ± .44	5.9 ± .40	.09
Global Well-Being (0-110)	73.5 ± 4.1	76.7 ± 3.5	.56
Self-Efficacy			
Important to complete goals	8.6 ± .34	8.8 ± .36	.72
Confident in completing goals	7.6 ± .38	7.5 ± .41	.97
Health Locus of Control			
Internal	28.7 ± 1.1	30.6 ± .76	.17
Chance	19.6 ± .70	18.7 ± 1.1	.47
Powerful Others	21.3 ± .75	22.6 ± 1.1	.37

Continuous variables compared using independent t-test
Categorical variables compared using chi-squared test

Randomization was successful and baseline demographic characteristics did not differ between groups (Table 1). Overall, 52 women completed follow-up data collection ($n = 26$ intervention). At the end of the study, psychological general well-being index, self-efficacy (importance of and confidence in goal setting and attainment), and health locus of control scores and sub-scores did not vary by intervention status (Table 2). Among those in the intervention group, 6-month goal attainment (yes/no) was not significantly associated with the three indicators of health behavior change outcomes of interest.

When examining the association between aspects of the intervention itself and indicators of health behavior change at the end of the study, resource program contacts and goal track emerged as significant for confidence in completing goals and health locus of control internality, respectively (Table 3). As number of resource program contacts increased, so did confidence in goal attainment. And compared to women who set a job skills goal, women who set an education advancement goal had lower internal locus of control scores at the end of the study (32.3 vs. 28.9, $p = .02$). Several other factors approached statistical significance (Table 3).

Table 2
Post-intervention scores (mean ± SE) for indicators of health behavior change outcomes of interest (and their reference values)

	Control $n = 26$	Intervention $n = 26$	*p*-value
Psychological General Well-Being Index			
Anxiety (0-25)	18.3 ± .79	18.4 ± .79	.945
Depressed Mood (0-15)	12.6 ± .47	13.1 ± .47	.492
Positive Well-Being (0-20)	14.5 ± .65	14.4 ± .65	.929
Self-Control (0-15)	11.9 ± .49	12.1 ± .49	.855
General Health (0-15)	12.4 ± .36	12.1 ± .36	.630
Vitality (0-20)	13.5 ± .65	13.6 ± .65	.870
Global Score (0-110)	83.4 ± 2.7	83.5 ± 2.7	.963
Self-Efficacy			
Important to Complete Goals (0-10)	8.6 ± .26	9.0 ± .25	.300
Confident in Completing Goals (0-10)	8.0 ± .29	7.9 ± .28	.738
Health Locus of Control			
Internality (6-36)	30.3 ± .69	29.9 ± .68	.669
External Chance (3-36)	19.4 ± .86	19.6 ± .84	.876
External Powerful Others (6-36)	20.9 ± .83	19.3 ± .83	.193

Linear regression examining significance of intervention status while controlling for baseline value of outcome

Table 3
Coefficients and confidence intervals for intervention aspects and association with indicators of health behavior change outcomes while controlling for baseline value of health behavior change outcome

	4m Goal Attainment	2m Goal Attainment	Support Person Contacts	Resource Program Contacts	Goal Track 1 vs 2	Goal Track 1 vs 3
Perceived General Well-Being Index						
Anxiety	3.1 [-0.22, 6.40]*	1.7 [-1.6, 4.9]	.67 [-1.6, 2.9]	-.97 [-3.4, 1.5]	2.5 [-3.7, 8.6]	2.1 [-1.1, 5.4]
Depressed Mood	0.82 [-1.01, 2.65]	.83 [-.84, 2.5]	.68 [-.46, 1.8]	-.72 [-2.0, .56]	1.6 [-1.8, 5.0]	.87 [-.95, 2.7]
Positive Well-Being	0.59 [-2.08, 3.26]	.77 [-1.6, 3.1]	.09 [-1.6, 1.7]	1.1 [-2.7, .54]	.98 [-3.5, 5.5]	.42 [-3.0, 2.2]
Self-Control	0.94 [-0.77, 2.64]	.58 [-1.0, 2.2]	.05 [-1.1, 1.2]	.88 [-.21, 2.0]	.69 [-2.4, 3.8]	.54 [-2.2, 1.1]
General Health	0.12 [-1.3, 1.5]	.18 [-1.4, 1.1]	.18 [-.72, 1.1]	.07 [-.83, .97]	.09 [-2.3, 2.5]	-.44 [-1.7, .83]
Vitality	0.62 [-1.8, 3.0]	1.4 [-.75, 3.5]	-.70 [-2.2, .82]	-.21 [-1.8, 1.3]	-1.5 [-5.6, 2.6]	-1.5 [-3.7, .66]
Global Score	5.5 [-3.1, 14.1]	4.9 [-2.9, 12.6]	1.3 [-4.3, 6.8]	-1.5 [-7.3, 4.4]	2.7 [-12.8, 18.2]	-.77 [-9.1, 7.6]
Self-Efficacy						
Important to Complete Goals	.42 [-.57, 1.4]	-.31 [-1.3, .63]	.24 [-.41, .89]	.11 [-.55, .77]	.78 [-1.1, 2.7]	.16 [-.79, 1.1]
Confident in Completing Goals	-.13 [-1.3, 1.1]	.79 [-.30, 1.9]	-.03 [-.81, .76]	.82 [.10, 1.5]**	-.67 [-2.8, 1.5]	-.48 [-1.6, .67]
Health Locus of Control						
Internality	-1.5 [-4.4, 1.4]	.76 [-2.1, 3.6]	-.07 [-2.4, 2.3]	1.1 [-.74, 3.0]	-4.1 [-8.6, .40]*	-3.3 [-6.0, -.71]**
External Chance	-.88 [-5.1, 3.3]	.42 [-2.9, 3.8]	-.27 [-2.7, 2.2]	-1.0 [-3.6, 1.5]	-2.7 [-9.6, 4.3]	.16 [-3.9, 4.2]
External Powerful Others	-1.8 [-6.9, 3.2]	-1.5 [-5.8, 2.7]	-2.2 [-4.9, .45]*	2.4 [-.33, 5.2]*	-.37 [-9.1, 8.3]	.09 [-4.8, 5.0]

Goal track 1 = job skills
Goal track 2 = personal finance
Goal track 3 = educational advancement

* P-value > .05 & < .10
** P-value ≤ .05

DISCUSSION

Interventions that address the root causes of health disparities among AIs are needed. As such, the present study aimed to improve socioeconomic factors in young AI mothers by using motivational interviewing to encourage the setting and attainment of goals related to income, occupation, or education, as well as utilization of community resources. Although participation in

the intervention did not lead to differences in indicators of health behavior change at the end of the study, results do provide useful insight into individual elements of the intervention that should be examined further. Furthermore, suggestions for future research in this area are provided.

Socioeconomic factors, particularly income, occupation, and education, are associated with health disparities experienced by AI/ANs (Robert Wood Johnson Foundation, 2009). Improving socioeconomic status by improving these factors can lead to improved health behaviors (Hanson & Pourier, 2015; Pampel et al., 2010). Because this was a pilot study and only 6-months in duration, indicators of health behavior change that could serve as proxies for longer-term changes in health behavior were assessed. Indicators of health behavior change included an assessment of psychological general well-being index, health locus of control, and self-efficacy related to goal-setting and attainment. These factors were chosen because of their relationship with long-term health behaviors and outcomes (Pampel et al., 2010).

At the end of the study, intervention status was not associated with any of the measured indicators of health behavior change. However, this lack of change may be due to baseline scores being more favorable than anticipated. At the beginning of the study, mean global PGWBI scores were 76.7 in the intervention group (max score being 109 for control group and 108 for intervention group), leaving little room for improvement. Likewise, importance of goal setting was high, as was confidence in completing goals (mean scores were 8.8 and 7.5, respectively). Internal health locus of control was also high (mean of 30.6), while chance was low (mean of 18.7). Together, these assessments speak to the resilience of the study participants – despite disadvantaged situations (as evidenced by social readjustment and rating scale) and low socioeconomic status (as evidenced by income and education), perceived general well-being and internal locus of control can be seen. This should be considered when developing interventions focused on changing socioeconomic factors in this population.

Because the intervention itself was not significantly associated with the chosen indicators of health behavior change, elements of the intervention were explored individually to determine if certain pieces were significant on their own. While 6-month goal attainment itself was not associated with any of the indicators of health behavior change, attainment was relatively low among the 26 intervention completers ($n = 15$). As part of the intervention, goals that were specific, measurable, and achievable with a defined timeline were encouraged. However, the use of motivational interviewing as part of the goal-setting process meant ultimate control of the goal

was up to the participant. As such, not all goals were necessarily achievable for one reason or another. Further development of supports for goal achievement is warranted.

Resource program contact was associated with confidence in goal attainment, such that increased confidence at the end of the study was associated with an increased number of contacts. Perhaps participants who had more contacts with resource programs were better able to utilize their services and supports, thus enhancing confidence. Future work should explore the importance of community-connectedness and social support in interventions aiming to improve social determinants of health among AIs. Goal topic also appears to be important, with higher health locus of control internality seen among women who set a job skills goal compared to those who set an education advancement goal. Job skills goals may have been more attainable in general, and education advancement goals may have had more potential barriers and thus be more difficult to attain. For example, someone may have set an educational advancement goal related to perfect attendance in a college course; however, a seemingly uncontrollable barrier related to childcare or transportation prevented this, thus leaving the individual feeling like they lacked internal control of the situation.

There are limitations to this pilot study. Although a sample size calculation was performed, it assumed that participants would meet the goal that they set; however, only 58% did. Additionally, attrition in the intervention group ($n = 4$) was greater than anticipated, but due to circumstances outside of the control of the study team. These issues likely impacted the ability to determine a significant effect of the intervention on the indicators of health behavior change that were examined. Despite these limitations, this pilot study has strengths, including the uniqueness of its approach in addressing health disparities. This study can provide lessons learned for future research aiming to improve socioeconomic status among disadvantaged populations, including connecting individuals with community resources and focusing on occupation-related achievements. Further data analysis is warranted on variables related to percent of goal attainment to understand factors that promoted or hindered goal attainment.

CONCLUSION

Innovative interventions are needed to address socioeconomic status and, ultimately, health disparities, particularly among young AI mothers. Setting and achieving goals related to advancing income, education, or job skills may be one way to improve socioeconomic status. In a longer or more intensive goal-setting and attainment intervention, with a larger sample size, changes in

indicators of health behavior change may be seen, particularly if goals are focused around job skills. The long-term benefits of changes in internal locus of control as a result of goal attainment need further exploration.

REFERENCES

Adler, N. E., & Newman, K. (2002). Socioeconomic disparities in health: Pathways and policies. *Health Affairs, 21*(2), 60-76. https://doi.org/10.1377/hlthaff.21.2.60

Angell, M. (1993). Privilege and health—What is the connection? *New England Journal of Medicine, 329*(2), 126-127. https://doi.org/10.1056/nejm199307083290210

Centers for Disease Control and Prevention. (2016). Behavioral Risk Factor Surveillance System Survey Questionnaire. Retrieved from https://www.cdc.gov/brfss/questionnaires/index.htm

Center for Evidence-Based Practices at Case Western Reserve University. (2010). Readiness Ruler. Retrieved from https://www.centerforebp.case.edu/resources/tools/readiness-ruler

Chassany, O., Dimenäs, E., Dubois, D., Wu, A., & Dupuy, H. (2004). *The Psychological General Well-Being Index (PGWBI) user manual*. Lyone, France: MAPI Research Institute.

Collaborative Research Center for American Indian Health (CRCAIH). (n.d.). About. Retrieved from https://www.crcaih.org/about-crcaih

Egan, J. T., Leonardson, G., Best, L. G., Welty, T., Calhoun, D., & Beals, J. (2009). Multidimensional health locus of control in American Indians: The Strong Heart Study. *Ethnicity & Disease, 19*(3), 338-344. https://www.ncbi.nlm.nih.gov/pubmed/19769018

Espey, D. K., Jim, M. A., Cobb, N., Bartholomew, M., Becker, T., Haverkamp, D., & Plescia, M. (2014). Leading causes of death and all-cause mortality in American Indians and Alaska Natives. *American Journal of Public Health, 104*(S3), S303-S311. https://doi.org/10.2105/ajph.2013.301798

Galea, S., Tracy, M., Hoggatt, K. J., Dimaggio, C., & Karpati, A. (2011). Estimated deaths attributable to social factors in the United States. *American Journal of Public Health, 101*(8), 1456-1465. https://doi.org/10.2105/ajph.2010.300086

Hanson, J., & Pourier, S. (2015). The Oglala Sioux Tribe CHOICES Program: Modifying an existing alcohol-exposed pregnancy intervention for use in an American Indian community. *International Journal of Environmental Research and Public Health, 13*(1), 1-10. https://doi.org/10.3390/ijerph13010001

Leonardson, G. R. (2003). Validity and reliability of the General Well-Being Schedule with Northern Plains American Indians diagnosed with type 2 diabetes mellitus. *Psychological Reports, 93*(5), 49-58. https://doi.org/10.2466/pr0.2003.93.1.49

Miller, W. R., & Rollnick, S. (Eds.). (1991) Motivational interviewing: Preparing people to change addictive behavior. New York, NY, US: The Guilford Press.

O'Leary, R., McCormack, L., Huber, C., Hockett, C. W., Moran, A., & Pesicka, J. (2019). Developing the Tribal Resource Guide and the Poverty and Culture Training: The We RISE (Raising Income, Supporting Education) Study. *American Indian and Alaska Native Mental Health Research, 26*(2), 134-150. http://dx.doi.org/10.5820/aian.2602.2019.134

Pampel, F. C., Krueger, P. M., & Denney, J. T. (2010). Socioeconomic disparities in health behaviors. *Annual Review of Sociology, 36*(1), 349-370. https://doi.org/10.1146/annurev.soc.012809.102529

Robert Wood Johnson Foundation, Commission to Build a Healthier America. (2009). *Reaching America's heath potential: A state-by-state look at adult health* (Rep.). Retrieved from http://www.commissiononhealth.org/Documents/AdultHealthChartbookFullReport.pdf

Wallston, K. A. (2005). The validity of the Multidimensional Health Locus of Control Scales. *Journal of Health Psychology, 10*(5), 623-631. https://doi.org/10.1177/1359105305055304

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