



# Solutions for Wellness: Outcome Review and Analysis of a Healthy Lifestyle Group

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### Abstract

Individuals with serious mental illness (SMI) experience a notably decreased life span due, in part to a metabolic syndrome linked to psychotropic medications commonly prescribed to SMI patients. Eli Lilly's Solutions for Wellness (SFW) program was designed to address some of the risk factors (e.g., weight, diet, lifestyle) that exacerbate the metabolic syndrome in SMI outpatients. However, there is limited data as to the effectiveness of the SFW program for hospitalized SMI patients. We replicate and compare SFW outcomes from an inpatient SMI population treated at the Utah State Hospital with previous research that tested an abbreviated SFW curriculum of eight lessons in a similar clinical population. Primary outcomes include changes in weight and body mass index (BMI) for 127 SMI patients. Factors that might explain outcome differences included gender, age, diet, medication profile are explored.

### Keywords

Psychoeducation, Health promotion, Mental illness, Metabolic syndrome, Psychotropic medications, Weight, Schizophrenia

### Introduction

Individuals with a severe mental illness experience a well-documented decrease in life span. Parks, Svendsen, Singer, and Foti determined that individuals with a serious mental illness (SMI) die an average of 25 years younger than the general population [1]. Disease and lifestyle choices are a primary cause of this excess mortality [2]. Although obesity is a considerable national health epidemic in the United States general population, the rates for obesity in the SMI population are considerably higher (42% vs. 27%) [2,3]. Research literature also suggests that SMI, such as schizophrenia, serve as a risk factor for metabolic syndrome even in antipsychotic naïve patients. Jacob and Chowdhury discovered that individuals under the age 55 years with schizophrenia are four times more likely to have metabolic syndrome and twice as likely to die from cardiovascular disease as the general population [4]. In addition to an inherently increased risk for metabolic danger, the use of nearly any antipsychotic medication can contribute to increased weight gain which, in turn, increases potential metabolic sequel [3,5,6].

Several known contributors to early death in this population are modifiable, such as obesity, tobacco use, sedentary lifestyle,

and unhealthy diet choices. Increased risk of metabolic syndrome, diabetes, and cardiac disease also significantly contribute to these mortality rates. The Substance Abuse and Mental Health Services Administration (SAMHSA) and Health Resources Services Administration (HRSA) point out that this decreased lifespan is "among the greatest health disparities experienced by any subgroup in the United States" [7].

Research has also shown that weight management successfully decreases the risk of diabetes, cardiac disease, and other metabolic related health complications. Overweight and obese individuals experience health benefits with as little as a 3-5% weight loss [8,9]. Weight loss programs are widely available to the general population and include options like Weight Watchers, Jenny Craig, Slim Fast, Atkins, and other diets. Research findings show that these interventions can result in statistically significant weight loss. This, in turn, decreases risk for weight-associated medical complications and diseases [10].

The National Association of State Mental Health Program Directors (NASMHPD) Medical Directors Council outlines suggested standards of care to address this health concern. These suggestions include classifying the problem as a priority health disparity, building on SAMHSA evidence-based practices on healthy lifestyles, promoting integrated mental and physical healthcare, implementing standards of care for prevention, screening, and treatment [1].

Nurses are in an advantageous position to provide psychoeducational group interventions, as well as information to promote healthier lifestyle choices. The theoretical underpinnings of psychoeducational groups is that the information provided lead to behavior and symptom change and there is ample empirical evidence in the group literature to empirically support this theoretical assumption [11,12]. Eli Lilly's Solutions for Wellness (SFW) is one example of manualized group interventions that are designed to provide education towards healthy lifestyle choices in individuals with SMI [13,14]. The program began in 1998 and has undergone several revisions [15]. One study focusing on SFW effectiveness from over 7,000 program completers reported a mean weight change of -4.5 kg for those who lost weight and +4.2 kg for those who gained weight. Individuals who completed the program lost an average of 2.77 kg [16]. The SFW program is included in the SAMHSA National Registry of Evidence-Based Programs and Practices (NREPP), which

**Table 1:** Summary of SFW nutrition and physical activity lesson plans.

SFW – Nutrition Lessons	SFW – Physical Activity Lessons
1. Choosing Healthy Eating and Wellness	1. Mental Illness, Mental Health, and Physical Activity
2. A Small Changes Approach to Healthier Eating	2. Step Into Better Health
3. Food and Our Environment	3. Physical Activity and Our Environment
4. Benefits and Barriers of Healthy Eating	4. How Physically Active Are We?
5. Healthy Eating and Wellness Self-Assessment	5. The Benefits and Barriers of Being Physically Active: Part I
6. What Kind of Hungry Are You?	6. The Benefits and Barriers of Being Physically Active: Part II
7. Get the Facts: Nutrition Knowledge is Power	7. Fitness Self-Assessment and Goal Setting
8. Dietary Guidelines for Americans	8. Creating Balance
9. Adequate Nutrition within Calorie Needs: What Do the Guidelines Say?	9. Step Out of Stress
10. Food Groups to Encourage: What Do the Guidelines Say?	10. Physical Activity and Safety
11. Weight Management Part I: What Do the Guidelines Say?	11. Fitting Physical Activity into Your Daily Routine
12. Weight Management Part II: What Do the Guidelines Say?	12. What to Choose: Different Types of Physical Activities
13. Managing Stress Wisely	13. Aerobic Exercise
14. Portions and Servings: Know How Much You're Eating	14. Flexibility Exercise
15. Strategies to Improve Eating Habits	15. Strengthening Exercise
16. Carbohydrates: What Do the Guidelines Say?	16. Tobacco and Your Health
17. Alcoholic and Non-alcoholic Drinks: What do the Guidelines Say?	17. Staying on the Road to a Healthier You
18. Tips for Eating Wisely on a Limited Budget	
19. Food Safety: What do the Guidelines Say?	
20. Fats: What do the Guidelines Say?	
21. Salt (Sodium) and Potassium: What do the Guidelines Say?	
22. Staying on the Road to a Healthier You	

gave the program an overall 3.3 readiness for dissemination rating (on a scale of 0.0-4.0) [17].

SFW is structured for use with outpatient participants. Our application relied upon the 3<sup>rd</sup> Edition of SFW which consists of 22 nutrition lessons, and 18 physical activity lessons. Other adaptations in the literature range from a 4 week/8 lesson Acute-SFW format to 10, 12, and 36 week formats. This study tested both an abbreviated and full SFW nutrition and physical activity curriculum, delivered in 45 minute weekly groups summarized in table 1. This article evaluates the outcomes experienced by 127 inpatients attending the SFW groups led by registered nurses at state psychiatric hospital. Specifically, we aimed to answer four research questions: (1) Did SFW work statistically? (2) Did SFW work clinically? (3) How did patients' medication class effect outcomes? And (4) What other moderators predict patient outcomes?

### Intervention

USH began offering the SFW program to patients at the Treatment Mall in an effort to provide education to allow participants to make health-improving choices. These choices, in turn, could potentially lead to decreased risks of metabolic syndrome and associated healthcare complications. Limited literature exists regarding program outcomes on psychiatric inpatients since SFW's was designed to be used with an outpatient population. Only one article studied a similar population using an abbreviated SFW curriculum, Acute Solutions for Wellness. More specifically, it was applied to an inpatient population and offered as an 8 week group intervention that consisted of the following lessons: Healthy Living, Physical Activity, Food Pyramid, Food Servings, Fat & Salt, Healthy and Unhealthy Eating Habits, High Fiber Diet and Controlling Your Hunger [18]. Overall, results from this previous study did not demonstrate statistically significant weight loss; participants experienced a mean weight gain of 0.26 kg weight gain (SD = 2.02; median = 0 kg). Weight loss or maintenance was reported in 33 of their 46 patients. The authors identified several limiting factors, including small sample size and reduced program length.

The current study takes into consideration the factors that SAMHSA-HRSA (2012) identified as frequently overlooked when interpreting and applying lifestyle interventions for the SMI population [19]. Common limitations include relatively small sample sizes, limited information on gender, lack of information regarding proportion of individuals experiencing significant weight change,

and limited information in regards to medication interventions [7]. We attempted to incorporate these suggestions herein.

## Methods

### Participants

Participants were selected from the English speaking population receiving treatment at USH- a 24 hour inpatient psychiatric facility for patients with severe and persistent mental illnesses. The study was not funded, but was approved by the Utah State Department of Human Services Institutional Review Board. Informed consent was not obtained because participation in this study involved attending a regularly offered group and was considered treatment as usual.

When the study began, USH had five adult civil units and one geriatric unit with an average of 30 beds per unit. During the study, one adult civil unit was closed. In addition, USH has four forensic units and 3 pediatric units which were not part of this study. Illnesses treated at the hospital include psychotic, substance abuse, mood, cognitive, eating, personality, and childhood disorders. A breakdown of 483 patient diagnoses being treated during the study period was 22% anxiety, 20% schizophrenia, 17% schizoaffective, 14% major depression, 11% for bipolar disorder, 4% other psychotic disorders, and 13% other Axis I diagnoses.

In order to recruit participants, class information was sent to all treatment teams for the adult civil units and referrals were made by treatment teams in each unit. The announcement included the target population, proposed schedule, and objectives for each group session.

### Treatment

SFW groups were held at a Treatment Mall, and participants were recruited from the English speaking, adult, civil patient population at USH. Group information, including the name and topic of the group, as well as recommended inclusion criteria were sent to the treatment teams for all adult patients. Treatment teams consisted of psychiatrists, administrative directors, unit nursing directors, and social workers. Recommended inclusion criteria from Eli Lilly's manual:

- Body mass index (BMI)  $\geq$  30 OR
- BMI  $\geq$  25-29.9 or high waist circumference (> 40" men/> 35" women) &
- 2 or more risk factors (disease conditions, other obesity-associated diseases, and/or cardiovascular disease risk factors)

**Table 2:** Common psychotropic medication ordered by risk of weight gain.

Low Risk	Moderate Risk	High Risk
Aripiprazole	Chlorpromazine	Clozapine
Asenapine	Risperidone	Olanzapine
Haloperidol	Lurasidone	Quetiapine
Ziprasidone		
Paliperidone		
Fluphenazine		

Participants consisted of those whose treatment teams referred and those who requested to attend the program. Patient weights were measured on their treatment units monthly. BMI is automatically calculated by the USH electronic charting system-E-chart. Hospital protocol requires patient weight and vital signs be recorded in E-chart monthly, unless ordered more frequently. The weight and BMI data collected for this study came from E-chart entries that aligned with the time frame that the patient was in the Solutions for Wellness Group. The researchers also collected E-chart information relating to a patient's psychiatric medications, and whether the patient was on a regular or a prescribed diet (heart healthy, carb controlled, etc).

Groups consisted of weekly 45 minute classes and the Eli Lilly's Solutions for Wellness structured outline was followed for each group, which included: welcoming group participants, reviewing the previous weeks main learning points, reviewing the previous weeks small step goal, introduction of new material, pre-quiz, new lesson material, review, and each member choosing a new weekly small step goal. Groups were initially set to a nine week duration to parallel the Bushe, et al. abbreviated lesson format [18]. The most pertinent lessons were selected; 1, 2, 3, 4, 5, 10, 11, 12, and 13 of the Healthy Eating curriculum. However, no significant weight loss was found. Based upon SAMHSHA-HRSA's recommendations that program interventions lasting longer than three months are more effective, we transitioned to the full 39 lesson SFW Nutrition and Physical Activity plan described in table 1. Groups had an average of 13 patients per group and an average attendance rate of 50%. Reasons for missed groups included other appointments, trial leaves, medical illness, or unit restriction [19].

## Analysis

Due to gaps in treatment, patient data was first broken out into discrete episodes. An episode of treatment was defined as continuous participation in SFW group with no gaps in treatment longer than four weeks. This practice is consistent with hospital practice to drop a patient from a group after three consecutive weeks of missed treatment. Patients who had been dropped from group could later be re-enrolled when referred by their treatment team. Two separate analyses were conducted- one using all patient data, and one using first treatment episode data.

The outcome measure of interest in the present study was changes in weight, measured before and after the SFW intervention. To investigate question 1, whether the program was statistically successful, a paired sample t-test was performed comparing patients' pre- and post-treatment weights. If patient data included a gap in treatment greater than four weeks, analysis was performed on the first discrete episode of treatment. This practice was meant to prevent patient data from being examined multiple times within the same analysis. Results are reported excluding one extreme outlier, bringing the total N to 114. In order to examine question 2, whether the program was clinically successful, patients who had experienced clinically significant weight change were identified- which previous literature established as a 5% change in weight from pre to post [9]. The percent of patients that experienced clinically significant weight loss was then calculated.

As previous research has found that individuals on high risk medication that participated in the Solutions for Wellness intervention maintained their weight without losing or gaining weight, question 3 evaluated the effect of medication class. This was done through a one-way analysis of variance (ANOVA), with weight change pre- to

post-treatment as the dependent variable and medication class as the factor. Patient psychiatric medication profiles were taken into account using the recent literature on weight gain risk associated with psychotropic medications, and three categories of medication risk were created (Table 2) [3,6,20]. Finally, in order to answer question 4, what other moderators predict weight change, a regression analysis was performed with medication category, starting weight, sessions attended, gender, age, and prescribed diet as predictor variables and weight change as the dependent variable. SPSS Version 21 was used for all analyses.

## Results

Treatment was administered to 127 patients at USH, but 11 of those patients were excluded from analyses due to lack of recorded post-treatment weight and BMI. These patients (54 males, 62 females) had a mean age of 38.25 (17- 69, SD = 11.0). The average starting weight was 200.25 (112- 449, SD = 55.11), and the average starting BMI was 31.42 (16.5- 62.6, SD = 8.39). Twenty-five (21.6%) of the patients were either taking no antipsychotic medication or a low risk of weight gain medication, 21 (18.1%) of patients were on a medium risk of weight gain medication, and 70 (60.3%) of patients were on a high risk of weight gain medication. Of the 116 patients included in the analysis, 89 started in the obese or overweight category. Before analyses were performed, patient data was first broken in to distinct episodes of treatment. A total of 131 episodes resulted from the 116 program participants. Results were similar when analyzing all episodes and first episodes only for each client, and results for first episode only are reported below.

### Did lilly work statistically?

Overall, the patients lost an average of 0.86 lbs. (42.8 lb. loss- 23.6 lb. gain, SD = 10.22) over the course of the SFW treatment. A paired sample T-test revealed no statistically significant change between starting and ending weight,  $t(113) = 0.90, p = 0.37$ .

### Did lilly work clinically?

Of the 88 (77.2%) patients that started in the overweight or obese BMI category, 12 of those patients (10.5%) experienced clinically significant weight loss, 16 (14%) experienced clinically significant weight gain, and the remaining 86 (75.4%) did not experience a clinically significant weight change. On average, the patients gained 0.02% of their body weight (SD = 4.94).

### How did patients' medication class effect patient outcomes?

As a primary moderator of interest, the effect of medication class on weight change was examined. An ANOVA showed that weight change differed by medication category,  $F(2,111) = 5.23, p = 0.007$ - with the no medication/low risk med class losing 6.33 lbs., the medium risk medication class gaining 0.3 lbs., and the high risk med class gaining 0.91 lbs.

### What other moderators predict patient outcomes?

In addition to medication, several secondary moderators of weight change were also examined using a linear regression. These included starting weight, sessions attended, gender, age, and diet. Of these secondary moderators, starting weight significantly predicted weight change ( $B = -0.32, p = 0.002$ ), such that a higher starting weight was associated with greater weight loss. Medication class was not found to be significant after controlling for the other variables. Gender, age, and diet were not found to be significant predictors of weight loss.

## Discussion

Both SAMHSA and NASMHPD have flagged the SMI decreased life span and metabolic syndrome as serious health concerns that must be addressed. Our study initially replicated one of the few SMI inpatient applications of the abbreviated Solution for Wellness group program and like Bushe and colleagues, we found no statistically significant weight loss [18]. The primary focus of our study was an

implementation of the full 39 lesson SFW program in daily practice with a SMI inpatient sample size that more than doubled the Bushe, et al. investigation [18]. This longer intervention addressed one of SAMHSA-HRSA (2012) limitations of past SMI research [19]. We addressed additional limitations by noting the proportion of patients who gained, lost or maintained weight and exploring potential moderators raised in the literature; beginning weight, sessions attended, gender, age and diet. Finally, we explored the interaction of weight loss/by with medication class.

Application of the full SFW intervention produced the same lack of statistical change noted by Bushe, et al. when patients were tested as a group [18]. A portion of the sample lost (10.5%) or gained (14%) weight, so, we explored this variability and found that the medication a patient was taking was associated with final weight status. The average patient in the low risk category lost over 6 pounds compared to an average weight gain of 1 pound in the high risk category. At face value, these findings support past research that has shown differential effects of psychotropic medication on weight gain [3,6,20]. Stated differently, SMI inpatients whose medication profile falls in our low risk category may benefit from the full SFW group intervention.

Our replication of the Bushe, et al. findings for the abbreviated SFW intervention suggests that 8-9 sessions may be insufficient to achieve significant weight loss with SMI inpatients. Moreover, our findings extend beyond the Bushe, et al. study by connecting length of treatment and medication profile of SMI inpatients to successful weight loss replicating Litrell, et al. findings [18,21]. While based upon a much larger sample than Bush et al. These findings must be replicated with similar samples before our conclusions are accepted and applied in practice [18]. Additionally, high risk patients in the present study were referred to the SFW program and not randomly assigned. Future research should examine the effects of SFW in a randomized controlled trial format.

We also included a moderator analysis to determine if the variability in weight loss could be explained by starting weight, sessions attended, gender, age and diet. The only variable that was significantly related to weight change was starting weight which replicates a general finding in the weight loss literature. Thus, better candidates for programs such as the SFW group intervention may be those who exceed normative weight expectations. Interestingly, in our study the significance of medication class disappeared after starting weight was entered into our linear regression equation. Since this is one of the first studies we could locate that focused upon an SMI inpatient population, we're unclear on the clinical implications of this finding. It may be that both starting weight and medication class matter but that our sample was too small to sufficient power statistical detection of both. On the other hand, there may be an interaction between starting weight and medication class (i.e., multicollinearity) such that the former (starting weight) contains enough common variance with medication class that it drops out as a significant predictor. Given the preliminary nature of this finding it too awaits further study and replication.

## Conclusion

In conclusion, our findings when coupled with Bushe, et al., suggest that the abbreviated SFW group intervention is ineffective for SMI inpatients [18]. This finding is in agreement with past recommendations regarding treatment length for SMI patients [19]. However, modest weight loss success may result when the full 39-session SFW program is applied to SMI in patients who are in the low risk psychotropic class or whose starting weight is higher than the average patient. These findings are limited by the average group attendance observed in our study (50%), the medications represented in our patient population, the population treated at USH, and unknown leader factors that may affect treatment success.

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