

Effects and Feasibility of the “Traffic Light Method for Somatic Screening and Lifestyle” in Patients With Severe Mental Illness: A Pilot Study

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The authors report no actual or potential conflicts of interest.

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PURPOSE: To study the preliminary effects and feasibility of the “Traffic Light Method for somatic screening and lifestyle” (TLM) in patients with severe mental illness.

DESIGN AND METHODS: A pilot study using a quasi-experimental mixed method design with additional content analyses of lifestyle plans and logbooks.

FINDINGS: Significant improvements were found in body weight and waist circumference. Positive trends were found in patients’ subjective evaluations of the TLM. The implementation of the TLM was considered feasible.

PRACTICE IMPLICATIONS: The TLM may contribute to a higher quality of care regarding somatic screening and lifestyle training.

Patients with severe mental illness (SMI) generally have a poorer health status than people from the general population, resulting in increased morbidity and mortality (Brown, Birtwistle, Roe, & Thompson, 1999; Marder et al., 2004; Saha, Chant, & McGrath, 2007; Tiihonen et al., 2009). It is estimated that people with SMI have a life expectancy of 15–25 years less than the general population, the main cause of death being cardiovascular diseases (CVDs) (McEvoy et al., 2005). A number of modifiable risk factors—including high rates of smoking, poor dietary habits, obesity, and sedentary lifestyle (Cabassa, Ezell, & Lewis-Fernandez, 2010; Harvey et al., 2008)—serve to compromise the physical health of SMI patients. Secondary weight gain and metabolic alterations associated with the use of second-generation antipsychotic agents contribute to the high prevalence of medical comorbidities and poor health outcomes (Cabassa et al.,

2010; De Hert et al., 2009). Furthermore, these patients may have limited access to general health care, with fewer opportunities for somatic screening and prevention compared to nonpsychiatric populations. Psychiatrists (De Hert et al., 2009, 2011a; Marder et al., 2004) and mental health nurses (Brunero & Lamont, 2009; Ohlsen, Peacock, & Smith, 2005; Shuel, White, Jones, & Gray, 2010; Usher, Foster, & Park, 2006) have developed a number of guidelines and tools aimed at better screening and monitoring of the physical health status of patients with SMI. Research has shown that mental health nurses can contribute effectively to these screening practices (Brunero & Lamont, 2009; Osborn, Nazareth, Wright, & King, 2010).

In recent years, mental health practitioners have paid a great deal of attention to diagnosing and treating metabolic syndrome (MS) (Brunero, Lamont, & Fairbrother, 2009;

Usher et al., 2006). MS is a combination of metabolic abnormalities in a single individual, and is associated with an increased risk of CVD. In addition to the focus on a more systematic screening and monitoring of the somatic condition of patients with SMI, lifestyle interventions to improve the health status of these patients have also received increased attention. Lifestyle interventions involve structured approaches that help individuals engage in physical activity, manage their weight, eat a balanced diet, stop smoking, and participate in health promotion activities (Cabassa et al., 2010). Studies into the effectiveness of lifestyle programs are inconclusive, although significant improvements have been reported in several systematic reviews regarding weight loss, MS risk factors, physical and mental health, and patient well-being (Bonfioli, Berti, Goss, Muraro, & Burti, 2012; Cimo, Stergiopoulos, Cheng, Bonato, & Dewa, 2012; Gorczynski & Faulkner, 2010).

Despite the increased attention for screening and lifestyle in SMI patients, and the recognized role of mental health nurses, there is a lack of practical tools for nurses to support them in these activities. For this reason, we developed the “Traffic Light Method for somatic screening and lifestyle” (TLM) in patients with SMI. In this article, we present the results of a pilot study of its effectiveness and feasibility. We formulated the following research questions:

1. What are the effects of the TLM on patients’ weight, waist circumference, blood pressure, and patients’ judgments regarding their personal physical condition, their exercise pattern and their eating pattern, compared to “care as usual”?
2. What lifestyle goals did the patients set?
3. What were the barriers and facilitators in achieving these goals, as perceived by the patients?

The TLM

We developed the “Traffic Light Method for somatic screening and lifestyle” (TLM) to be a practical tool for nurses and patients. The TLM consists of two main elements: a screening tool and an intervention tool.

The screening tool allows patients and nurses to gain an overview of health and lifestyle-related factors that contribute—whether positively or negatively—to the patients’ health status. Table 1 provides an overview of the screening components of the TLM.

Based on the results of the screening tool, an individual lifestyle plan is then constructed in close collaboration between the patient and the nurse. The lifestyle plan contains individualized lifestyle goals and activities concerning (among others) exercise, diet, smoking, alcohol use, substance abuse, hygiene (like teeth brushing), sleep, and safe sexual behavior. The patient’s motivation for behavioral change in relation to lifestyle areas directed the specific lifestyle issues that were included in the plan.

We developed a first version of the TLM based on existing scientific literature concerning somatic screening and lifestyle training of coaching (Brunero & Lamont, 2009; Cabassa et al., 2010; De Hert et al., 2009, 2011b; Gorczynski & Faulkner, 2010; Marder et al., 2004; Osborn et al., 2010; Shuel et al., 2010). The central components of the TLM were determined and operationalized. The TLM’s developers designed a clear format to promote its ease of use in clinical practice. After completing a first draft, we brought together a Delphi panel of experts to further develop and evaluate the TLM. Seven experts from different disciplines participated in the Delphi panel, including two nurse practitioners, a psychiatrist, an addiction physician, a professor of nutritional science, an internist, and a professor of lifestyle and health. In two rounds, these experts gave their comments on the TLM. The experts’ comments were summarized and returned as feedback to promote consensus building. Following the two Delphi rounds, the TLM developers had sufficient material at their disposal to draft the final version.

Some of the TLM items—for example, “use of antipsychotic medication”—are descriptive in nature. Many other items point directly to possible health risks, for example, the score for waist circumference or questions such as “How do you experience your physical health?” (score 0–10; 0 = worst score, and 10 = best score). The scoring possibilities on these items were divided into the three color categories of a traffic light. The “green” category referred to normal screening outcomes or healthy lifestyle behaviors. The “orange” category indicated medium-risk screening outcomes and lifestyle behaviors, and the “red” category warned for high-risk outcomes and unhealthy or very unhealthy lifestyle behaviors. For each item on the TLM, relevant cutoff points were determined based on the scientific literature and expert opinions.

Methods

Design

We conducted a mixed-methods pilot study with

1. A quasi-experimental design with an experimental and control group, taking measurements at baseline and at 3 months. The primary outcome measures were weight, waist circumference, and blood pressure. Secondary outcome measures were the patients’ evaluations of physical health, eating pattern, and exercise pattern (research question 1).
2. A content analysis of the patients’ lifestyle plans, inventorying individual lifestyle goals (research question 2).
3. A content analysis of the logbooks kept by the nurses/lifestyle coaches, describing barriers and facilitators as perceived by patients during the execution of the TLM (research question 3).

Table 1. A Summary of Screening Components of the "Traffic Light Method for Somatic Screening and Lifestyle"

The Traffic Light Method for somatic screening and lifestyle	
Demographics	Name; age; sex
Metabolic syndrome	Body mass index; weight; waist circumference; blood pressure; triglyceride (TG); high-density lipoprotein cholesterol (HDL); fasting plasma glucose (FPG)
Family diseases	Diabetes; cardiovascular diseases; obesity
"How satisfied are you with your physical health?"	Score 0–10 <ul style="list-style-type: none"> • Score 0–5 = red • Score 6–7 = orange • Score 8–10 = green
Physical handicaps	
Ethnicity	Increased risk of diabetes among Hindus, Creoles, Moroccans, and Antilleans
Psychotropic medications	Name; dosage; use since . . . ; comments
Other medications	Name; dosage; use since . . . ; comments
"How satisfied are you with your eating patterns?"	Score 0–10 (0 = worst score; 10 = best score) <ul style="list-style-type: none"> • Score 0–5 = red • Score 6–7 = orange • Score 8–10 = green
"How healthy do you eat in your own judgment?"	Score 0–10 (0 = worst score; 10 = best score) <ul style="list-style-type: none"> • Score 0–5 = red • Score 6–7 = orange • Score 8–10 = green
Nutrition pattern (last 7 days)	Regularity; quantity/variation; binge eating; content (on the basis of various categories of nutrition)
"How satisfied are you with your exercise pattern?"	Score 0–10 (0 = worst score; 10 = best score) <ul style="list-style-type: none"> • Score 0–5 = red • Score 6–7 = orange • Score 8–10 = green
Exercise pattern (last 7 days)	Categories: sedentary activities; light physical activity; medium physical activity; heavy physical activity
Substance use	Smoking; alcohol use; drugs use (soft drugs/hard drugs)
Sexuality	Condom use; sexually transmitted diseases
Other lifestyle factors	Dental hygiene; relaxation; sleeping pattern; outdoor activities

The research project was reviewed and approved by the local scientific committee of the participating mental health institution. Screening on health parameters is routine in this mental health institution and the TLM was already implemented in the treatment program on one location. Therefore, no medical ethical approval was necessary within Dutch legislation.

Setting and Participants

We conducted the study at a large mental health setting in the central part of the Netherlands. Three eligible departments took part in the study, providing inpatient and outpatient treatment to SMI patients. In order to avoid contamination between the intervention and the control condition, two departments at the same geographical location were allocated to the intervention group, while the third department at another location was allocated to the control group.

Patients were informed orally and in writing about the research project and were included after they had given

written informed consent. The following exclusion criteria applied (a) psycho-organic disorder, (b) insufficient command of the Dutch language, (c) IQ < 70 (as reported in the patient's records), (d) severe symptoms that hindered participation (clinical judgment clinician), (e) pregnancy, (f) severe somatic conditions (e.g., cancer, severe chronic obstructive pulmonary disease), (g) severe cognitive impairments (clinical judgment clinician), and (h) previous participation in our lifestyle program. The total population of the experimental departments amounted to 40 patients, of whom 21 participated in this pilot study. The total number of patients in treatment in the control department was 21, of whom 16 took part in the control group. Thus, the total sample consisted of 37 patients.

Procedures and Data Collection

After inclusion, baseline measurements were performed. In addressing our first research question, we used the TLM forms of the patients in the experimental group to extract

relevant data. For the control group, we made use of a data collection form to collect corresponding data.

Based on the TLM assessment at baseline, an individual lifestyle plan was assembled in the experimental group. We used these lifestyle plans to answer research question 2 concerning the nature of the lifestyle goals set by the patients. The plan was carried out over a period of 3 months after which the post-measurements were performed, again using the TLM forms for the experimental group, and the corresponding data collection form for the control group. During the implementation period, the specially trained nurses or lifestyle coaches assisted the patients in weekly 15-min sessions to implement the lifestyle plan. During these sessions, the nurses discussed and made note in a logbook of barriers and facilitators when working with the plan. We used these logbook data to answer our third research question, thus obtaining an impression of the feasibility of the TLM for the perspective of the patients.

In the control group, care as usual was delivered, meaning that no specific structured activities in somatic screening or lifestyle interventions were carried out.

To carry out the TLM, four mental health nurses were trained to serve as lifestyle coaches. The training lasted for 12 hr and included (a) basic components of motivational interviewing (Miller & Rollnick, 2002) and the stage of change model (Prochaska & DiClemente, 2005), (b) side effects of psychotropic medication, (c) lifestyle of and risks for SMI patients, (d) working with the TLM, and (e) environmental factors that affect effectively working with the TLM (e.g., the health behavior of staff members themselves or the availability of unhealthy products in the direct environment).

A clinical nurse specialist (the second author), specializing in somatic screening and lifestyle in SMI patients, provided the training. While performing the TLM, the mental health nurses received supervision from the same clinical nurse specialist.

Data Analysis

The two groups were compared at baseline according to the variables of sex, age, weight, systolic and diastolic blood pressure, and smoking. For comparison of the two groups on the dichotomous variable of sex, a chi-square test was employed. For the other continuous variables, a nonparametric test (the Mann-Whitney *U*-test) was used owing to the small sample size and the non-normal distribution of two of these continuous measures.

We conducted analyses of covariance, controlling for pretest scores and age to assess the TLM's effectiveness on body weight and blood pressure (systolic and diastolic), and on the subjective measures concerning patients' satisfaction with physical health, exercise pattern, and eating pattern. Due to scores missing from the control group for waist circumfer-

ence, we could only test differences in pre- and posttest scores within the experimental group using the nonparametric Wilcoxon signed-rank test.

To answer the second and third research questions on lifestyle goals and barriers and facilitators, we performed a content analysis using the patients' lifestyle plans and the nurses' logbooks. Lifestyle goals, barriers, and facilitators were inventoried with reference to the lifestyle plans and logbooks and were then ordered thematically based on content. The inventory formed the basis for a structured elaboration of lifestyle goals, barriers, and facilitators.

Results

Sample Characteristics

Thirty-seven patients participated in the study, 21 in the experimental group, and 16 in the control group. Thirty-one patients (83.8%) suffered from schizophrenia, the remaining six patients (16.2%) had the diagnosis borderline personality disorder, major depressive disorder, or bipolar disorder. Twenty-three patients were male and 14 were female. Mean age was 45.2 years ($SD = 13.0$). Mean weight was 85.8 kg ($SD = 20.5$) for men ($n = 22$), and 78.7 kg ($SD = 20.1$) for women ($n = 14$). Data about weight were missing for one male patient in the experimental group. Mean waist circumference of patients in the experimental group was 103.8 cm ($SD = 14.9$) for men ($n = 12$) and 100.7 cm ($SD = 18.1$) for women ($n = 7$). Data about waist circumference were missing for one male and one female patient.

Comparing the experimental and control groups at baseline, no significant differences were found regarding sex, weight, blood pressure, and smoking. However, the participants in the experimental group were significantly older than those in the control group ($M = 48.9$ vs. 40.4 ; $U = 98.000$, $z = -2.15$, $p < .05$).

Central Outcomes

To analyze our central outcome measures for weight and waist circumference, one male and one female patients were excluded, since their personal goal was to gain weight rather than lose it. For body weight, the analysis of covariance (controlling for pretest weight scores and age, $n = 33$) revealed a significant difference between the experimental group (adjusted mean: 82.6 kg) compared to the control group (adjusted mean: 85.7 kg): $F(1, 29) = 5.29$, $p < .05$. The partial η^2 of .15 indicates a large effect size.

For waist circumference, the Wilcoxon signed-rank test showed a significant reduction between the pre- and posttest measurements within the experimental group: $z = -2.366$, $p < .05$, with a Cohen's *d* of .59, indicating a medium effect size. No significant differences were observed in either systolic or diastolic blood pressure among our sample.

Table 2. Exemplary Quotes of Patients About Their Experiences With the Traffic Light Method

“I won’t quit smoking, but I’ll try to eat breakfast and to not eat a bag of crisps every day”
“I didn’t realize that sleeping more than 12 hours makes me feel even more tired.”
“I don’t feel patronized because I make my own decisions anyhow.”
“The fact that I was able to cross a bridge without dismounting my bike motivated me to go on.”
“It’s nice to be reminded of my goals ever so often.”
“I’m getting off medications, which helps me be more active.”
“I now eat breakfast every day.”
“It really helps when the coach gives me good grades. It’s nice and makes me proud.”

Subjective Evaluation

Concerning the subjective evaluation of physical health, exercise, and eating pattern, the analyses of covariance revealed no significant effects when comparing the experimental and control condition. However, some interesting trends could be observed. To the question “How satisfied are you with your physical health?” the test results showed a medium effect size with a (partial) η^2 of .09 ($F(1, 31) = 3.05, p = .09; n = 35$). The same medium effect size could be observed for the question “How satisfied are you with your exercise pattern?” ($F(1, 26) = 2.455, p = .13, \text{partial } \eta^2 = .09; n = 30$). To the question “How satisfied are you with your eating pattern” no trend was visible; this is in contrast with the question “How healthy do you think you eat?” where a medium effect size was also calculated: $F(1, 31) = 2.07, p = .16, \text{partial } \eta^2 = .06; n = 35$.

Lifestyle Goals, Barriers, and Facilitators

For 21 patients, data about their individual lifestyle goals and about perceived barriers and facilitators were derived from the lifestyle plans and the logbooks. In terms of treatment goals, 19 patients focused on increasing their activity level and 16 on a more healthy diet. In some cases, the goals regarding diet were formulated in general terms. In other cases, the goals were concrete: less sugar, salty snacks, cheese, eating breakfast, drinking milk, etc. Other goals mentioned in the lifestyle plans included the regulation of cholesterol, glucose, and blood pressure; to smoke less; improve sleep patterns; regulate fluid intake; reduce sleep medication; and to brush teeth.

The logbooks revealed that patients experienced many barriers and facilitators while preparing the lifestyle plan and working with it. As a facilitator, the most important factors were the support and motivation of the nurse/lifestyle coach. The increased patients’ subjective well-being was also experienced as a major facilitator. The majority of the patients felt better, slept better, felt challenged, were proud of their successes, and were happy with the compliments they received. Some patients experienced a more explicit sense of duty to take care of their personal physical health. They mentioned that they were more aware of their eating and exercise patterns by working with the lifestyle plan. For other patients, doing exercises with other patients was highly motivating.

Some facilitators were practical by nature: making a shopping list with the nurse to avoid unhealthy purchases; making unhealthy food unavailable in the immediate living environment; consciously monitoring and managing smoking with support of the nurse; the availability of sporting facilities and exercise clubs; and “not having money to buy unhealthy products.”

The most frequently mentioned barriers for the patients were the availability of unhealthy food in the immediate living environment and feeling tired as a result of increased physical efforts and the change in diet. The limited availability of nursing staff also hindered compliance with the lifestyle plan. Many patients indicated in one way or another that it was difficult for them to change their familiar routines in terms of diet and lack of exercise. Some patients did not like the healthy food. They missed the familiar products and some just did not feel like exercising. Boredom, stress, and distractibility were mentioned as reasons not to comply with the lifestyle agreements. They also mentioned poor physical shape and not knowing how and where to start making lifestyle changes as barriers to success. One patient felt too anxious to work out by himself and was afraid of getting lost when he went jogging outside on his own. Finally, they listed a number of mundane barriers such as bad weather, the partner who brings unhealthy food when visiting, or being in the company of other people who smoke or consume junk food. Table 2 provides a number of exemplary quotes from the participating patients about their experiences with the TLM.

Discussion

The pilot study’s preliminary results are promising: despite the small sample size, we were able to demonstrate a significant difference with a large effect size in terms of body weight between the experimental (where the TLM was carried out) and the control condition (where care as usual was delivered). Concerning waist circumference, although measured in the experimental group only, a significant reduction with a medium effect size could be determined when pre- and post-measures were compared. Interesting trends with medium effect sizes were found on the subjective evaluations of patients concerning satisfaction with their physical health, exercise patterns, and perceived quality of their diet. Patients

were generally positive about the lifestyle project and were able to point out a number of factors that hindered or fostered adequate implementation of the TLM. The stimulating and coordinating role of the nurses and lifestyle coaches was considered an important facilitator for successful implementation.

There is sound evidence from the scientific literature that the SMI patient group is highly vulnerable to somatic comorbidities and premature death. For this reason, the development, implementation, and testing of easy-to-use intervention methods deserve high priority. We developed the TLM as such, emphasizing the collaborative efforts of both patients and nurses to screen for somatic abnormalities, assess patient lifestyle behavior, and systematically plan and execute activities to improve the patients’ physical health and well-being. Previous studies have shown that nurses are well equipped to execute somatic screening in SMI patients (Brunero & Lamont, 2009; Ohlsen et al., 2005).

It is important to note that a special grant was available to train the nurses and lifestyle coaches, and to implement the TLM. It will be challenging for nurses and other professionals to implement this type of intervention under less optimal conditions—this is in the light of the well-known barriers for implementation at the patient, professional, and systemic level (see, e.g., De Hert et al., 2011a; Happell, Scott, & Platania-Phung, 2012; Robson, Haddad, Gray, & Gournay, 2013).

The results of our study can be placed in line with the studies of Brunero and Lamont (2009), Ohlsen et al. (2005), Usher et al. (2006), Sameby, Soderberg, Hedstrom, and Waern (2008), Morrison et al. (2000), and Shuel et al. (2010) who all make successful efforts to develop guidelines or instruments for nursing practice that contribute to effective screening practices and physical health promotion of SMI patients. The next step will be a large randomized controlled trial to test the (cost-) effectiveness of these promising nurse-led intervention strategies.

One limitation of our study is that – with the quasi-experimental design we applied – we cannot rule out that other factors than the intervention itself contributed to the positive effects in this study, for example, the extra attention the patients received when executing the intervention. However, there are good reasons to believe that the structured approach of screening and the execution of lifestyle interventions contributed to the observed effects, since this structured approach stands in sharp contrast with the unstructured and ad hoc approach in care as usual.

Another limitation of this study lies in the fact that we did not gain insight into possible improvements of the metabolic parameters (TG, HDL, and FPG). Knowledge about these parameters is crucial to determine whether or not the studied intervention strategies are successful in reducing the prevalence of MS as a major composite risk factor for CVD. A

longer follow-up is needed for the reliable assessment of changes in these parameters. Currently, an experimental study with longer follow-up study using the TLM is in progress in which these outcomes are being measured. A further limitation of this study is the absence of randomization. The comparison of some background characteristics among the patients, however, did not reveal significant differences between the two groups, except for age. In our analyses of covariance, we controlled for the possible effect of age on our outcome variables.

Next, it should be noted that due to the naturalistic design of the study, no clear inclusion criteria were formulated. The inclusion was based on the judgement of the clinician.

Other limitations include the small sample size, missing data for waist circumference in the control group, and the relatively short duration of this pilot study. Although the sample size was relatively small in this pilot study, we were able to detect significant differences between the experimental and control condition, as well as a number of promising trends.

Implications for Nursing Practice

This study suggests that methods like the TLM can be used effectively in nursing practice to improve the physical health outcomes of patients with SMI. A major implication is that nurses should take active responsibility for somatic screening and lifestyle interventions in close collaboration with the professionals from other (mental) healthcare disciplines. It offers opportunities for nurses to present themselves in the role of care managers, being responsible for planning, organization, coordination, and continuity of somatic care for SMI patients. Registered nurses and nursing students should be trained extensively in applying screening methods and planning and implementing lifestyle activities. Clinical nurse specialists, with their specialized knowledge of and skills in innovations of care, are in a position to coach and supervise registered nurses in these innovative processes.

To achieve the desired effects in improving health outcomes, nurses need the skills to tailor the screening and lifestyle activities to the needs and preferences of individual patients. The patients’ individual goals must be the main target. Screening, preparation, and implementation of the lifestyle plan are collaborative efforts. They require shared decision-making between patients and professionals. Ultimately, these intervention strategies may contribute to the self-management skills of patients to take greater responsibility for their health in line with their competencies and preferences.

Author Contributions

Berno van Meijel contributed to the design of the TLM, the conception and design of the study, the analysis and interpretation of the data, and the draft and revisions of the article.

Sonja van Hamersveld designed the Traffic Light Method and was responsible for the implementation of the method in clinical practice. She contributed to the design of the study, the acquisition of data, and the analysis and interpretation of the data. She revised successive versions of the manuscript.

Ronald van Gool contributed to the draft and revisions of the article.

Jaap van der Bijl contributed to data analysis and manuscript revisions.

Peter van Harten contributed to design development, the execution of the Delphi study, revision of successive versions of the manuscript, and approval of the final version for publication.

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