

## Using E-Mail Health Interventions and Transtheoretical Model to Promote Wellness: A Pilot Study

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### Abstract

**Purpose:** The purpose of this quasi-experimental study was to determine the effectiveness of one weekly e-mail health (e-health) message in assisting individuals meet their self-identified health goals. **Methods:** Employees (N=31) from a midwestern city were recruited at a Benefits Fair health booth and divided into two groups based on their desire to receive additional health information. The participants in each group were then randomly assigned to receive basic or detailed e-health messages that were developed using the constructs of the Transtheoretical Model. Participants self-identified a personal wellness goal and how soon they planned to start working toward accomplishing this goal. For 38 weeks, the basic group received weekly e-health messages that contained basic information related to one of the World Health Organization's seven dimensions of wellness while the detailed group received the basic message plus additional games, webpage links and more extensive information. Participant's progress along the change continuum and goal completion was assessed 38 weeks later with a Post-Wellness Survey. **Results:** Participants exhibited positive movement on the behavior change continuum with many reaching their goals, regardless of the type of e-health message received. **Conclusion:** E-health messages can be a practical, cost-effective way to assist employees in making healthy behavioral changes and meeting their personal health goals.

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*Keywords:* Transtheoretical model, e-mail, e-health messages, dimensions of wellness, stages of change.

### Introduction

Chronic diseases account for major limitations in activities of daily living for almost one out of 10 Americans, or 25 million people (Centers for Disease Control and Prevention, 2011). According to the Center for Disease Control and Prevention, chronic diseases such as heart disease, cancer and diabetes are the leading causes of death and disability in the United States and compromise 70% of all deaths. Four modifiable health risk behaviors (lack of physical activity, poor nutrition, tobacco use, and excessive alcohol consumption) are responsible for much of the illness and early death related to chronic diseases (Centers for Disease Control and Prevention, 2011). If these major risk behaviors for chronic disease were eliminated, at least 80% of heart disease, stroke and type-2 diabetes would be prevented, as well as 40% of all cancer (World Health Organization, 2010). Reducing or eliminating these modifiable risk behaviors would help

adults live longer and have more vigorous lives. Despite research available asserting benefits of health promoting activities, many individuals do not take steps to change their modifiable risk behaviors. There are a variety of reasons why adults do not practice health promoting behaviors including a lack of time, interest, resources, social support, and/or knowledge, as well as apathy toward improving their health (Goetzel & Ozminkowski, 2008). Moreover, some do not believe practicing health promoting behaviors will decrease their personal risk for developing chronic disease (Goetzel & Ozminkowski, 2008).

### Worksite Wellness Programming

Health promotion programming would be of interest to most employers, as such programming is likely to result in healthier employees, less absenteeism, and reduced health care costs (Goetzel & Ozminkowski, 2008). Health promotion programming may provide the

needed encouragement, assistance and motivation for employees to overcome perceived obstacles by improving their health and well-being. Many employers who have put health promotion programs into effect also believe that these programs can significantly influence an organization's ability to attract and keep top talent who are drawn to a company culture that encourages a work/life balance (Wolf, Parker, & Napier, 1994). In fact, some employers have made employee health promotion initiatives part of their overall emphasis on sustainability and corporate social responsibility (Goetzel & Ozminkowski, 2008; Wolf et al., 1994). The Task Force on Community Preventive Services (2010) found additional benefits for implementation of worksite wellness programs including increased employee awareness of health problems, early disease and risk detection, and medical referrals for employees who are at high risk for certain diseases. Still, some employers are less than enthusiastic about offering wellness programming, citing lack of employee interest, lack of staff resources and funds, lack of high-risk employee participation and lack of upper management support (Linnan, Bowling, Childress, et al., 2008).

### **E-Health Messages**

Worksite wellness programming may utilize many methods of communication including print materials, in-person sessions, telephone, and the internet (Linnan, Bowling, Childress, et al., 2008). Health messages (e-health messages) sent as e-mails or newsletter attachments, are a low-cost wellness initiative that may improve employees' health and have a larger return on investment for businesses over time therefore, the use of wellness messages is one way for an employer to begin wellness programming with limited start-up investment (Pew Internet & American Life Project, 2010). The technology available in today's workplace may be a key for providing knowledge and encouragement to employees who, in turn, may practice more health promoting behaviors (Kreps & Neuhauser, 2010). Since the majority of adults are employed and use the internet, workplaces where computers are easily accessible provide an excellent opportunity to expose a large number of adults to health promotion programs (Young,

2006). Many companies require employees to communicate using e-mail, so health and wellness information sent via e-mail may be another mode of motivating change. One e-mail health message can reach a large number of individuals quickly and privately, with little effort and little expense. Web-based wellness interventions are often preferred over print materials by workers (Cook, Billings, Hersch, Back, & Hendrickson, 2007).

### **Health Behavior Change Model**

The Transtheoretical Model (TTM), referred to as the stages of change theory, is a theory that describes how motivation can increase the likelihood of behavior change. This model assesses individuals' readiness to make health-behavior changes by focusing on their decision-making processes as they progress along the change continuum. This conceptual process unfolds over time and involves progression through five stages: precontemplation, contemplation, preparation, action, and maintenance (Prochaska & Norcross, 2001). The model involves emotions, cognitions, and behavior.

Stage one is the precontemplation stage, in which individuals have not made a decision or are not ready to start the healthy behavior in the near future, and even may be unaware of the need to change. The contemplation stage (stage two) occurs when individuals recognize that their current behavior may be negatively impacting their health. Often these individuals begin to weigh the pros and cons of their current behavior. Often individuals state that they intend to start the healthy behavior within the next six months. Individuals are in the preparation stage (stage three) when they plan to take action within the next 30 days. If change has occurred within the last six months, the individual is in the fourth stage, the action stage. The individual is in the maintenance stage (stage 5) if behavior changes have lasted six months or more (Prochaska & Norcross, 2001).

Past research has shown promising results using TTM to accomplish behavioral changes. A meta-analysis of 57 studies found that interventions which demonstrated the greatest effectiveness

were those that used each of the TTM stages compared to those not tailored to specific stages (Noar, Benac, & Harris, 2007). The TTM was successfully used to reduce health risk factors such as stress, depression, physical inactivity, obesity, and smoking (Dinger, Heesch, Cipriani, & Qualls, 2007; Evers, Prochaska, Johnson, Mauriello, et al., 2006; Prochaska, Butterworth, Redding, et al., 2008).

### **Purpose of the Study**

The purpose of this study was to determine the effectiveness of a low-cost, low-time commitment, worksite health promotion strategy of weekly e-mail health messages that addressed the overall wellness of employees. It was hypothesized that receiving a weekly e-mail health message related to one of the seven dimensions of wellness would help individuals progress through the stages of change construct of the TTM so that individuals could meet their health goals. Developed by the World Health Organization (WHO) (2008), wellness is a dynamic process of becoming aware of and making conscious choices toward a more balanced, healthy lifestyle. Wellness includes learning new life skills that address both the positive and negative aspects of human existence. Over the past decade, the concept of wellness has expanded into seven dimensions: physical, occupational, environmental, social, spiritual, emotional, and intellectual (WHO, 2008). It is the integration of these seven interactive dimensions that continually influence and balance each other to create overall wellness. Over-emphasis on just one or two dimensions results in a life that is out of balance (Swarbrick, 2006). All seven dimensions were used equally, because each aspect of wellness can affect overall quality of life. This study is unique in that the intervention was delivered using only e-mail health messages that included all of the World Health Organization's seven dimensions of wellness.

### **Methods**

This was a quasi-experimental study in that participants were randomly assigned to receive detailed or more generic wellness emails, after participants self-identified as being motivated or

unmotivated to receive e-health messages. The study protocol was approved by the North Dakota State University Institutional Review Board.

### **Sample**

The study population was comprised of city employees, of a city located in the Midwestern United States. At the time of the study, the city employed 818 full-time and part-time individuals (264 female and 554 male). Participants were recruited for participation in the study at the annual Benefits Fair, which included approximately 20 booths related to health promotion and employee benefits. At the time of this study, no other wellness programming was provided to the employees. Attendance at the Benefits Fair varies annually from 37-46% (300-375) of all employees.

Of the 351 employees who attended the Benefits Fair, 91 (25.9%) individuals completed baseline biometric measurements. Those participants who desired e-health messages were categorized as motivated participants (n=48, 22 male, 26 female), whereas those who did not indicate a desire to receive e-health messages were classified as unmotivated (n=43, 33 male, 10 female). Participants in these two groups were then randomly divided into groups according to the type of message: motivated-detailed (n=25), motivated-basic (n=23), unmotivated-detailed (n=20), and unmotivated-basic (n=23). Both motivated and unmotivated participants received e-health messages.

Of the 91 individuals who were sent a survey at baseline, 39 participants (male=15 and female=24) completed the Pre-Wellness Survey (42.9%) identifying a wellness goal and their readiness to change behavior to reach that goal. Of the 39 individuals who completed the Pre-Wellness Survey 70% were motivated (n=27) and 30% were unmotivated (n=12). Of the 39 participants, 31 of them completed the Post-Wellness Survey, identified their current stage of change, and indicated attainment of the goal set at baseline (79%). A total of 85% (n=23) of motivated participants who completed the baseline survey also completed the Post-Wellness Survey, whereas 67% (n=8) of the

unmotivated participants completed the Post-Wellness Study. This resulted in a sample size of 31 for this study (13 males, 18 females). The division of gender in this study was similar to the overall division of total employees for the city.

**Survey**

In order to determine if receiving e-health messages increased the likelihood of meeting self-identified health goals, all 91 study participants were asked to identify a baseline wellness goal on a Pre-Wellness Survey adapted from Robbins, Powers and Burgess (2011)

(Figure 1). Along with their wellness goal, participants identified their readiness to change by answering “How soon will you be starting your goal,” with each choice option representing a stage of change. Each stage of change was assigned a numerical value to measure change (Precontemplation=1, Contemplation=2, Preparation=3, Action=4, and Maintenance=5). All requested information was sent back to the investigator by e-mail. At the end of the intervention, the same survey was sent to all participants who completed the Pre-Wellness Survey. Participants were also asked if they met/accomplished their goal.

**Figure 1**

Pre-Wellness Survey Sample (two of seven dimensions shown) Adapted from: Robbins, G., Powers, D., & Burgess, S. (2011). *A wellness way of life*. pp. 23-25.

**PRE-WELLNESS SURVEY**

Name \_\_\_\_\_ Date \_\_\_\_\_

**Emotional**

Survey Area	Rating Scale					Your Score	
	0- never, no	1-occasionally, rarely	2-Sometime, maybe	3-often	4-yes, usually		5-yes, always
I am able to deal with day-to-day pressures.	0	1	2	3	4	5	
I can establish friendships easily.	0	1	2	3	4	5	
I am happy with myself.	0	1	2	3	4	5	
I am comfortable expressing my feelings with others.	0	1	2	3	4	5	
I feel as though I am in charge of my life.	0	1	2	3	4	5	
I perceive problems as opportunities for growth.	0	1	2	3	4	5	
My personal relationships are satisfying.	0	1	2	3	4	5	

**Physical**

Survey Area	Rating Scale					Your Score	
	0- never, no	1-occasionally, rarely	2-Sometime, maybe	3-often	4-yes, usually		5-yes, always
I am within 5-10 pounds of my ideal body weight.	0	1	2	3	4	5	
I exercise least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity activity	0	1	2	3	4	5	
I do not smoke	0	1	2	3	4	5	
I sleep at least seven to nine hours on most nights	0	1	2	3	4	5	
I do not abuse alcohol or binge drink	0	1	2	3	4	5	
I think my diet is balanced and wholesome.	0	1	2	3	4	5	
I have plenty of energy.	0	1	2	3	4	5	

Please list a health and wellness goal for yourself: \_\_\_\_\_

**How soon will you be starting your goal (check only one):**

- I will not start my goal for at least 6 months or longer
- I will be starting my goal within the next 1-6 months
- I will be starting my goal in the immediate future (within the next 1-30 days)
- I have been actively working on my goal for the last 3-6 months
- I have been actively working on my current goal for 6 months or longer

## Intervention

The marketing materials for the Benefits Fair encouraged employees to have their blood pressure measured and their body mass index (BMI) calculated at the wellness booth. Employees visiting the wellness booth were invited to participate in the study, and those individuals who agreed completed an informed consent form. Criteria for participation included having blood pressure, height, and weight measured. The participants were given a folder with various health and wellness brochures along with a ticket that made them eligible to win a \$20 gift card in a drawing. On this ticket, participants were asked if they desired to receive health information and tips through their work e-mail account. Those individuals who desired e-mail health messages were categorized as motivated participants, whereas those who did not indicate a desire to receive e-mail health messages were classified as unmotivated. Motivated and unmotivated participants were placed into two separate lists, and were randomly selected to receive either basic or detail e-mail health messages by purposeful randomization.

Since January is an optimal time to initiate wellness strategies and programs due to the start of a new year (Norcross, Mrykalo, & Blagys, 2002), participants received a weekly e-mail health message starting in January. The information for all the messages was from websites that presented easy to understand information consistent with current research. The foci of the messages were based on the various topics identified in the Pre-Wellness Survey. The basic messages (sent to the motivated-basic and unmotivated-basic groups) contained one or two paragraphs of information about the wellness dimension assigned for that week. These messages were considerably briefer and rarely had any links for additional information. In addition to the information contained in the basic message, detailed messages (sent to the motivated-detailed and unmotivated-detailed groups) contained links to a variety of assessments, quizzes, videos, and/or more information. Figure 2 is an example of an e-health message.

## Figure 2

### Example of Basic and Additional Information for Detailed E-Message

#### Basic Message:

#### EMOTIONAL WELLNESS FACTS AND TIPS

#### Supportive relationships: The foundation of emotional health

No matter how much time you devote to improving your mental and emotional health, you will still need the company of others to feel and be your best. Humans are social creatures with emotional needs for relationships and positive connections to others. We're not meant to survive, let alone thrive, in isolation. Our social brains crave companionship—even when experience has made us shy and distrustful of others.

#### Information Added to Basic Message to Make the Detailed Message

#### Tips and strategies for connecting to others:

- Get out from behind your TV or computer screen. Screens have their place but they will never have the same effect as an expression of interest or a reassuring touch. Communication is a largely nonverbal experience that requires you to be in direct contact with other people, so don't neglect your real-world relationships in favor of virtual interaction.
- Spend time daily, face-to-face, with people you like. Make spending time with people you enjoy a priority. Choose friends, neighbors, colleagues, and family members who are upbeat, positive, and interested in you. Take time to inquire about people you meet during the day that you like.
- Volunteer. Doing something that helps others has a beneficial effect on how you feel about yourself. The meaning and purpose you find in helping others will enrich and expand your life. There is no limit to the individual and group volunteer opportunities you can explore. Schools, churches, nonprofits, and charitable organization of all sorts depend on volunteers for their survival.
- Be a joiner. Join networking, social action, conservation, and special interest groups that meet on a regular basis. These groups offer wonderful opportunities for finding people with common interests – people you like being with who are potential friends.

For more information go to: [http://www.helpguide.org/mental/mental\\_emotional\\_health.htm](http://www.helpguide.org/mental/mental_emotional_health.htm)

Using the basic tenets of TTM and strategies described by Prochaska, Norcross, and DiClemente (1994), e-health messages were constructed to assist an individual progress through the stages of change continuum, following the strategies. To assist participants with moving to the next stage of change, e-health messages included (depending on the participants stage):

- Precontemplation: think about the goal, becoming well-informed and aware.
- Contemplation: think about pros and cons of the health goal.
- Preparation: making an action plan, committing to change, and taking small steps.
- Action: reward self, obtain support, and control the environment.
- Maintenance: remind self of the health goal obtained and review the list of the negative aspects of the past negative health behavior regularly.

A total of 38 messages, one per week, with the same subject line (Weekly Health and Wellness Tip) focused on one dimension of wellness: physical, intellectual, emotional, spiritual, social, environmental, or occupational wellness. A total of five to six e-health messages for each wellness dimension were sent by a scheduled rotation, which was Friday, Tuesday, Thursday, Wednesday, and Monday. Messages that were opened were tracked by date and time using ReadNotify.com.

**Statistical Analysis**

The data were analyzed using SAS (version 9.2.2, SAS Institute, Cary, NC). Fisher’s exact test was used to determine movement along the change continuum and goal attainment from baseline to the end of the study period.

**Results**

As seen in Table 1, there were no significant differences noted among groups at baseline (p=0.64). The participant’s self-identified stage of change was reported on the Post-Wellness

Survey. As noted in Table 1, each group’s stage of change improved overall; however, the overall mean stage of change for each group at the end of the study was not statistically significant.

**Table 1**

Participant Reported Pre- and Post- Stage of Change				
	Pre(Mean±SD)	Post(Mean±SD)	Change (Mean±SD)	p-value*
Total (N=31)	3.23±1.06	4.03±1.20	+0.80 ±1.17	0.08
Motivated Detailed(n=14)	3.00±0.88	3.71±1.14	+0.71±1.38	0.09
Motivated Basic (n=9)	3.33±1.22	3.77±1.48	+0.44±0.73	0.17
Unmotivated Detailed (n=3)	3.67±1.53	4.67±0.58	+1.00±1.00	1.00
Unmotivated Basic(n=5)	3.40±1.14	5.00±0.00	+1.60±1.14	0.04
p-value	0.64	0.57	0.53	
By Types of Messages				
Detailed Messages(n=17)	3.12±0.99	3.88±1.11	+0.76±1.30	0.07
Basic Messages (n=14)	3.36±1.15	4.21±1.31	+0.85±1.03	0.42
p-value	0.91	0.36	0.79	
By Motivational Level				
Motivated Participants(n=23)	3.13±1.01	3.74±1.25	+0.61±1.16	0.07
Unmotivated Participants (n=8)	3.50±1.20	4.88±0.35	+1.38±1.06	1.00
p-value	0.43	0.18	0.33	

\*p-values derived from Fisher’s exact test

All groups showed a trend in advancing along the change continuum with an overall mean change of 0.80, (±1.17, p=0.08). As seen in Table 2, unmotivated study participants had over double the goal obtainment rate as the motivated participants (87.5% vs. 34.8%, p=0.02); however, the unmotivated study participants as a whole were closer to the action and/or maintenance stage at the start of the study than the motivated study participants (3.50 vs. 3.13). A total of 74.2% (n=23) of participants were in the action or maintenance stage 38 weeks after baseline compared to 41.9% (n=13) at baseline. Overall, nearly half of the study participants reported that they obtained the health goal they determined at baseline (n=15, 48.4%). Individuals who received basic e-health messages had higher rates of goal obtainment

than individuals who received more detailed messages (64.3% vs. 35.3%).

**Table 2**

Number and Percent of Participants Who Reached Goal Attainment		
N=31	Goal Attainment (%)	p-value*
Total	15 (48.4)	0.02
Motivated Detailed (n=14)	3 (21.4)	
Motivated Basic (n=9)	5 (55.6)	
Unmotivated Detailed (n=3)	3 (100.0)	
Unmotivated Basic (n=5)	4 (80.0)	
By Types of Message		
Detailed Messages (n=17)	6 (35.3)	0.016
Basic Messages(n=14)	9 (64.3)	
By Motivational Level		
Motivated Participants (n=23)	8 34.8	0.02
Unmotivated Participants (n=8)	7 (87.5)	

\*p-values derived from Fisher's exact test

**Discussion**

The purpose of this study was to determine the effectiveness of a low-cost, low-time commitment, worksite health promotion strategy of weekly e-mail health messages that addressed the overall wellness of employees. This study was unique in that the intervention was delivered using only e-mail health messages that included all of the World Health Organization's seven dimensions of wellness. Although almost half of all participants met their personal wellness goal, there were few differences in outcomes, in regards to the type of messages received. Those under the detailed e-health message condition failed to experience a significant stage of change in the 38 weeks of the study. This lack of change is similar to the results found by Noia and Prochaska (2009), in which the TTM intervention failed to experience change in two of the four potential mediators (cons and self-efficacy) in a dietary study. In both Noia and Prochaska's research (2009) and the current

study, users received e-health messages (either detailed or basic); however, a weakness of both of the designs was the lack of opportunity for the participants to respond to important cues and to receive personalized feedback. Current literature does not provide individualized feedback, just tailored messages for a group of individuals at a particular stage in the TTM (Lustria, et al, 2013). Moreover, each individual may interpret tailored messages differently. Therefore, future research should investigate if providing more individualized feedback framed according to TTM can significantly assist participants in having greater forward movement along the change continuum, thus improving health promotion behavior.

Motivation and self-efficacy are the key components when attempting to make behavior changes and move into the action or maintenance stage. Indicating a desire to work towards a goal is different than actually working to make the goal. Keeping individuals moving toward their goals is another key component. Encouraging individuals to select their own health goal allowed the participants to take ownership; therefore, the individual would be more likely to make positive strides to attain their goal.

This research showed that 74% (n=23) of participants were in the action or maintenance stage 38 weeks after baseline compared to 42% (n=13) at baseline. In an exercise study utilizing TTM conducted by Findorff, Hatch-Stock, Gross, and Wyman (2007), participants did not select their own goals. At baseline, all the participants were either in the precontemplation or contemplation stage; however, at the end of a one year post intervention 60% of the participants were either in the action or maintenance stage. There are possible explanations for the differences between studies. When a participant sets personal goals, the individual may be more likely to complete them. Another explanation may be that it takes longer to move through multiple stages to the maintenance stage.

## Limitations

Although the unmotivated groups (detailed and basic) had the greatest movement through the TTM change continuum and toward goal attainment, they also had the smallest percentage of participants (26%) who completed both the Pre and Post Wellness Survey. The small number of participants limited options for statistical testing.

Another limitation in this study was that participants self-reported their stage of change and if they met their self-identified goal; therefore, the information from this study could be subject to bias. Past research indicated that people overestimate their stage of change relative to their physical activity and possibly other health behaviors (Marshall & Biddle, 2001).

All employees had access to computers during the hours they were at work; however, some employees had greater access than others. There is a possibility that limited computer access for some employees may have affected the number of messages read and, thus, the goal-attainment level. More research is needed in the area of goal attainment via e-health promotion.

## Implications

This research shows a trend that e-health messages, regardless of whether employees are

motivated or not, or if the e-health messages are basic or more detailed, may assist employees in making behavior changes. These e-mail health messages can help assist individuals in progressing along the change continuum to reach their self-identified health goals.

Findings of this study have implications for managers, supervisors, and health-promotion staff responsible for implementing worksite wellness initiatives for their companies. When an individual identifies a personal health goal, that individual will be more likely to be motivated to accomplish the goal that may be more relevant. By providing a wide variety of topics spanning several months, employee wellness may improve. Additional research with a larger sample size is needed to validate our findings related to utilizing the TTM to assist employees in reaching their health goals.

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