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Evaluation of Implementation Fidelity in the Delivery of EnhanceFitness Classes

in King County, Washington

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## **ABSTRACT**

Implementation fidelity refers to the degree to which core elements of an intervention are delivered as intended by the protocols(Gearing et al., 2011). EnhanceFitness(EF) is a group exercise program with research-proven health benefits for older adults. The purposes of this study are to:1) summarize data from EF Instructor Review forms to determine implementation fidelity in the delivery of EF classes in King County, Washington, and2) make recommendations on strategies to improve quality delivery of EF program. We analyzed 133 EF Instructor Review forms representing fidelity checks of 73 instructors. Results show EF instructors provide adequate quality in adhering to EF fidelity, yet most had difficulty with delivering strength training and stretching. No statistically significant correlation is found between monitoring interval and instructor performance. In conclusion, EF program should require additional instructor training, practice and booster sessions in strength training and stretching, and carefully plan allocation of resources for instructor reviews.

## BACKGROUND

Successful translation of evidence-based interventions into practice requires careful attention to implementation fidelity. Implementation fidelity refers to the degree to which core elements of an intervention are delivered as intended by the protocols (Gearing et al., 2011). A type III error occurs when an intervention is not delivered in full, leading to faulty conclusions about a study's effectiveness (Basch, Sliepcevich, Gold, Duncan, & Kolbe, 1985; Frank, Coviak, Healy, Belza, & Casado, 2008). Absence of essential components when an effective intervention is applied to real world settings may result in failure of program to yield the intended results as designed (Bellg et al., 2004; Elliott & Mihalic, 2004; Frank et al., 2008). Evaluation of implementation fidelity is therefore crucial to the continued effectiveness and quality delivery of an evidence-based intervention.

An adequate measure of implementation fidelity requires assessing: 1) adherence to the intervention protocol, and 2) competence in program delivery (Breitenstein et al., 2010; Cross & West, 2011). Adherence measures the quantity or presence of core elements of intervention protocol, while competence refers to how well the protocol is implemented or the quality delivery of an intervention (Breitenstein et al., 2010).

Fixsen, Naoom, Blase, Friedman, and Wallace (2005) described a framework for implementation science that includes core implementation components: staff selection, preservice and inservice training, ongoing consultation and coaching, staff evaluation (evaluation of implementation fidelity), program evaluation, facilitative administrative support, and system interventions. The interventionist level components of this framework

are staff selection, training, and consultation and coaching. Implementation fidelity evaluation acts as a feedback mechanism to the interventionist level components to improve interventionists' performance and ultimately effect targeted improvements of the intervention. Therefore, implementation fidelity evaluation creates a feedback loop to inform interventionist selection requirements, improvements in training, and ongoing consultation and coaching.

Despite the importance, strategies used in evaluating implementation fidelity have historically been underreported (Bellg et al., 2004; Borrelli et al., 2005; Calsyn, 2000; Resnick et al., 2005; Santacroce, Maccarelli, & Grey, 2004). For example, a review of literature from several prominent psychology, psychiatry, and family therapy journals published from 1980 through 1998 indicated that less than 55% of the 359 reviewed articles documented the use of fidelity monitoring methods (Moncher & Prinz, 1991). Similarly, Borrelli et al. (2005) evaluated 342 articles of health behavior research published from 1990 to 2000, among which 54% were found to fail in reporting the use of fidelity monitoring strategies. Pereplechikova, Treat, and Kazdin (2007) reviewed randomized controlled trials published in 6 psychological and psychiatric journals between 2000 and 2004, and found that fidelity procedures were rarely reported in the literature, with only 3.5% of evaluated interventions adequately addressing fidelity.

EnhanceFitness (EF) is a low-cost, highly adaptable, multi-component group physical activity program for older adults. EnhanceFitness participants have reported an improvement in their emotional health and social functioning (Belza et al., 2006; Shumway-Cook et al.,

2007; Wallace et al., 1998). Additionally, EnhanceFitness participants have reduced hospitalizations and lower health care costs than non-participants (Ackermann et al., 2003; Ackermann et al., 2008).

EF classes meet three times a week. The one hour class includes 5-8 minutes of warm-up, 20 minutes of cardiovascular endurance (aerobics), 3-5 minutes of cool-down, 20 minutes of strength training, and 8-10 minutes of stretching exercise. Balance and posture are incorporated into other components of the class. There are two versions of EF classes: 1) Level 1 (seated), developed for physically frail or unsteady older adults; 2) Level 2 (standing), original class design for majority of participants. Most EF classes are a mixture of Level 1, Level 2, or somewhere in between (Senior Services, 2012). Since its beginning in 1993, EF has expanded rapidly and been adopted by a growing number of organizations. By the end of 2012 EF classes were offered in 400 sites, in 26 states, and reached over 10,000 older adults.

To ensure that the positive health outcomes demonstrated in the research are replicable when the intervention is widely disseminated in community settings, multilevel strategies and tools have been used by EF program to track and enhance implementation fidelity to the core elements of its original study. Frank et al. (2008) used the fidelity model developed by National Institute of Aging's Behavior Change Consortia (NIA BCC) to describe EF fidelity strategies and tools at multiple levels, including study design, training, delivery, receipt, and enactment. Belza, Snyder, Thompson, and LoGerfo (2010) discussed EF strategies to maintain fidelity at the interventionist level that include instructor training and certification,

ongoing consultation and coaching, onsite instructor reviews, instructor self-assessment, participant feedback, program evaluation, use of instructor manual, and support from EF administrative network.

In the delivery of EF program, instructor reviews have been conducted periodically to ensure that instructors continue to adhere to EF protocols when teaching EF classes. More specifically, EF Master Trainers (who conduct the EF New Instructor Training, provide support to new instructors, and review classes and instructors) visit and review an EF class one month after each EF instructor starts teaching and then annually or more often if warranted. A standardized assessment tool “EF Instructor Review form” is used by the Master Trainer to help evaluate the degree to which core components of protocol are delivered as intended by EF instructors. Evaluation results are provided to and discussed with EF instructors regarding their adherence to the EF protocols and needed adjustments in instruction techniques (Frank et al., 2008). All reviews are kept in database at Senior Services. Senior Services is a non-profit community-based organization based in Seattle, WA, and has been the legal owner of EF since 1999. However, there is no published study that has reported how instructors have performed teaching EF when observed by an EF master trainer. By 2012, there are 292 active EF instructors across the nation (Florida excluded), among which 108 (37%) are teaching EF classes in King County, Washington. For purposes of this study, only forms collected from EF instructors teaching in King County were analyzed.

The purposes of this study were to: 1) summarize data from the EF Instructor Review forms to determine implementation fidelity in the delivery of EF classes in King County, Washington and 2) make recommendations on strategies to improve the quality delivery of EF program based on the fidelity findings. The specific research questions are: 1) What are the type of sites and size of EF classes for which fidelity checks are done? 2) What is the monitoring interval and its relationship to instruction performance? 3) What is the ratio of each core element of the EF protocol being delivered below the standard, at standard, or above standard? And 4) What improvements could be added to EF instructor training to address the fidelity findings?

### **SIGNIFICANCE**

The “Baby Boomers” (those born between 1946 and 1964) started turning 65 in 2011, and the number of older people will increase dramatically during the 2011-2030 period. By 2030, the older adults will more than double to about 72 million, accounting for nearly 20% of the total U.S. population (Federal Interagency Forum on Aging-Related Statistics, 2012). The rapid growth of older population has far-reaching implications for nation’s health system, placing unprecedented demands on the provision of health care and aging-related services, and leading to an estimated 25% increase in the nation’s health care spending (Centers for Disease Control and Prevention, 2011)

Physical activity helps promote healthy aging with evidence to reduce the risk of chronic diseases, relieve symptoms of depression, help to maintain independent living, and enhance overall quality of life (U.S. Department of Health and Human Services, 1996; American



College of Sports Medicine, 1998). Despite the health benefits, the U.S. Department of Health and Human Services found that three out of four older adults do not get enough regular physical activity.

Evidence-based programs like EF, when brought to scale, hold the potential to address this public concern by increasing public health impact, reach and gains to senior participants and by achieving population health improvement. It is therefore important for delivery organizations of EF to maintain implementation fidelity over extended periods, helping to: 1) assure continued implementation validity, 2) maintain consistent program implementation across sites, and 3) avoid injuries as well as a number of unintended effects for participants and instructors (Botvin, 2004; Buckwalter et al., 2009; Dusenbury, Brannigan, Hansen, Walsh, & Falco, 2005; Ferretti & Brick, 2006; Hill, Maucione, & Hood, 2007; Korda, 2013)

## **METHODS**

### **Design**

Using a cross-sectional design, data was drawn from the EF Instructor Review forms to determine fidelity in the delivery of EF classes in King County, Washington.

### **Sample**

All available electronic forms of the EF Instructor Review for King County were used for this study. There are 133 EF Instructor Review forms representing evaluations of 73 instructors that were conducted and documented in King County, Washington from January 5, 2009 to January 28, 2013. Among these 73 EF instructors, 42 have one fidelity check

record, 15 have two fidelity check records, 7 have three fidelity check records, 5 have four fidelity check records, and 4 have five fidelity check records.

## **Measures**

EF Instructor Review form documents geographic characteristics of EF instructor review, such as name of instructor and master trainer, site type, class size, previous, current and follow-up monitoring date. A summary section reflects the overall teaching performance of EF Instructors in eight core elements, including record keeping, overall instruction, warm-up, aerobics, cool-down, strength training, balance, and stretching. Specific requirements for each element are also listed and rated in 8 subsections. Sub-elements exist within core elements of record keeping, overall instruction, balance, strength training, and stretching.

EF Instruction Review form gives an adequate measure of implementation fidelity. The quantity of core elements of EF protocol is assessed by checking over each core element in the summary section and specific requirements in the following section. How well EF protocol is implemented is measured by evaluating instructors' adherence to each requirement as compared with EF standard, and rated as above standard, meet standard, and review protocols (below standard).

Certain weights are assigned to each standard category, with 2 to above standard, 1 to meet standard, and 0 to review protocols. Narrative comments are also given on each core element in the second and third part regarding instructors' teaching performance and techniques.

## **Data Analysis**

The data were analyzed using SPSS for Windows version 13.0. Descriptive statistics were used to depict the type of sites, size of classes, monitoring intervals, as well as the number and percentage for each core element that was delivered below, at and above standard in summary section. Bivariate correlation was done to determine the relationship between the instructor's performance and the interval for follow-up monitoring.

## **RESULTS**

### **Site type and class size**

The EF sites are grouped into 5 categories with the majority of classes held in senior or community center (n=33, 67.4%), followed by retirement community (n=11, 22.5%), church (n=3, 6.1%), athletic facility (n=1, 2.0%), and health maintenance organization (n=1, 2.0%).

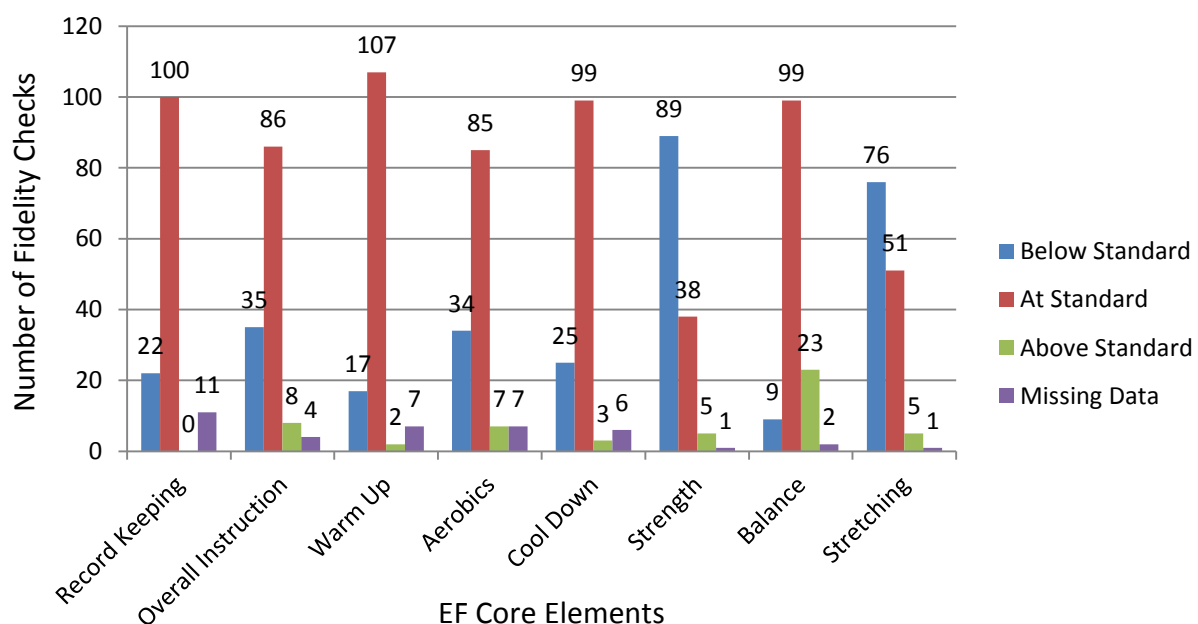
The number of participants in EF classes during site visits was on average 13 ( $SD \pm 7$ , range 2 - 37). Of the 133 EF classes during which the instructors were monitored, 48 classes had over 15 participants, and 9 classes had over 25 participants.

### **Correlation between monitoring interval and instruction performance**

Of the 61 fidelity checks that had a follow-up visit, the average monitoring interval was 11 months ( $SD \pm 7.39$ ; range 1-34). The instruction performance is measured by: 1) the number of elements that have been delivered below standards as a percent of those that have ratings, and 2) the ratio of omitted elements. The higher the ratio, the poorer the instructor has performed in teaching an EF class. The results show a poor correlation between monitoring interval and instruction performance ( $p_1=.066$ ,  $p_2=.051$ ), which yields no statistical significance.

## EF Quality Delivery

Figure 1 summarizes the number and percentage for each core element of EF protocol that was delivered below the standard, at standard, and above standard. Over 80% of fidelity checks had most elements of the EF protocol delivered at or above standard. The items that received the highest above standard ratings were balance (n=23, 17.6%), overall instruction (n=8, 6.2%), and aerobics (n=7, 5.6%). The items that were most likely to be delivered below the standard were strength training (n=89, 67.4%) and stretching (n=75, 56.8%).



**Figure 1 Quality Delivery of Core Elements of EF protocol**

Of the 133 fidelity checks, number and valid percentage (the number responding as a percent of those who responded) for specific requirements of strength training and stretching that were delivered below standard is demonstrated in Table 1 and Table 2. In strength training, instructors had more difficulty in teaching exercises for muscle groups of posterior deltoids, dorsiflexors, hip extensors, anterior deltoids, and knee flexors. Almost half of instructors failed to include all required stretching exercises. The muscle groups that received higher rate

of being delivered below standard were exercises for biceps, soleus, inner thigh, triceps, and anterior deltoids.

**Table 1 Quality Delivery for Strength Training**

Sub-elements	Specific Requirements	Number and valid percentage for specific requirements been delivered below standard
Equipment	Ensure cuff weights are used appropriately.	23, 17.8%
	Ensure hand weights are used properly	10, 8.8%
Cueing	Provide appropriate breathing cues.	19, 15.8%
	Demonstrate proper form and cue correct technique	31, 24.0%
	Provide appropriate modifications	23, 18.7%
Content: Upper Body	Anterior deltoids	43, 33.1% *
	Posterior deltoids	48, 36.6% *
	Biceps	26, 19.7%
	Triceps	38, 29.0%
Content: Lower Body	Knee extensors	28, 21.7%
	Knee flexors	43, 32.8% *
	Hip abductors	34, 26.0%
	Hip extensors	45, 35.2% *
	Plantar flexors	36, 27.7%
	Dorsiflexors	47, 36.2% *
	Sit-to-stand	29, 22.5%

**Table 2 Quality Delivery for Stretching**

Sub-elements	Specific Requirements	Number and solid percentage for specific requirements been delivered below standard
Overall Performance	Includes all required stretching exercises.	56, 43.1% *
	Each stretch is held for 20 to 30 seconds.	28, 21.7%
Content: Upper Body	Anterior deltoids	32, 24.4% *
	Posterior deltoids	33, 25.2%
	Biceps	41, 31.5% *
	Triceps	37, 28.5% *
	Fist and fling	30, 23.3%
	Shoulder shrugs	26, 20.2%
	Shoulder rotations	24, 18.3%
	Scapular retraction	25, 19.4%
	Neck	19, 14.6%
	Deep breathing	10, 7.6%
	Gastrocnemius (calf) stretch	20, 15.3%

Content: Lower Body	Soleus	37, 30.1% *
	Inner thigh	38, 29.5% *
	Quadriceps	34, 26.2%
	Hamstrings	30, 23.1%
	Ankle point and flex	30, 23.3%

\* Items that received higher rate of being delivered below EF standard.

## DISCUSSION

The EF Instructor Manual (2012) suggests that the maximum number of participants in an EF class is 25. For participant safety, it is recommended to have an EF assistant for any class with more than 15 participants. The results show that the majority (n=124, 93.2%) of classes had less than 25 participants. However, most classes (N=40, 83.3%) with over 15 participants didn't have an assistant. Of 9 classes that had more than 25 participants, only 3 (33.3%) classes had an assistant. An increase in participant-to-instructor ratio might increase the risk of injuries, decrease the quality delivery of EF program, and result in the failure of a class to show demonstrated health benefits. Issues regarding participant-to-instructor ratio should be addressed in EF instructor training and with the site administrator. Besides EF instructors, an assistant might be an experienced class participant, a fitness student from a local college, or a community volunteer.

On average, instructors in King County were monitored once a year (ranging 1 week to 34 months). This is congruent with the recommendations that reviews should be done on an annually basis. Without data on the date of each instructor training, we are unable to determine if the first fidelity check was conducted within a month of the training or with what interval was the subsequent training conducted.

The lack of statistically significant correlation between instructors' performance and interval for follow-up monitoring might imply that instruction performance is not the only indicator that has been used by Master Trainers to decide how often one instructor should be monitored. Other factors might be considered such as change of workplace, staffing turnover, modifications in EF Instruction protocols, and recommendations from participants. The result could also indicate an ineffective allocation of resources for EF instructor reviews as instructors who had more problems did not receive closer monitoring and teaching support.

The results of the EF quality delivery show that the instructors teaching EF provide adequate quality in adhering to the fidelity of EF. However, most instructors had difficulty with the delivery of strength training and stretching. This may indicate strength training and stretching are more complicated and require additional EF instructor training and practice and booster sessions. Exercise for muscle groups that had a higher rate of being delivered below standard should be specifically addressed. Further information is needed from EF instructors and EF master trainers, and investigation of narrative comments on EF Instructor Review forms to understand specific difficulties, in order to plan improvements.

### **LIMITATIONS**

This study has several limitations. First, fidelity checks in King County may not be the characteristics of other geographical areas and as such the results are not generalizable. Second, of the 133 fidelity checks, 20 (15%) forms have incomplete data in the summary section, which decreases sample size and bias the results. Third, 31 (42.5%) EF instructors had multiple fidelity check records accounting for the majority (N=91, 68.4%) of EF

Instruction Review forms. This might bias results for teaching performance as one instructor tends to demonstrate similar teaching techniques and skills over time. Forth, we lack information of EF instructor training date, and yet the number of forms we have with the first fidelity check is limited (N=26, 19.5%), and such we are unable to evaluate scheduling for the first instruction review.

### **FUTURE RESEARCH QUESTIONS**

Future research questions might include: 1) How effective are the fidelity checks on the delivery of EF? 2) What is the relationship between the instructor's performance on EF fidelity checks and the participants' health outcomes? and 3) How does King County EF fidelity check results compare with fidelity checks conducted in other locations?



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