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When 'just doing it' is not enough: Assessing the fidelity of player performance of an injury prevention exercise program

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ABSTRACT

Objectives: To obtain benefits from sports injury prevention programs, players are instructed to perform the exercises as prescribed. We developed an observational checklist to measure the quality of exercise performance by players participating in FootyFirst, a coach-led, exercise-based, lower-limb injury prevention program in community Australian Football (AF).
Design: Observational.
Methods: The essential performance criteria for each FootyFirst exercise were described in terms of the technique, volume and intensity required to perform each exercise. An observational checklist was developed to evaluate each criterion through direct visual observation of players at training. The checklist was trialled by two independent raters who observed the same 70 players completing the exercises at eight clubs. Agreement between observers was assessed by Kappa-statistics. Exercise fidelity was defined as the proportion of observed players who performed all aspects of their exercises correctly.
Results: The raters agreed on 61/70 observations (87%) (Kappa = 0.72, 95% CI: 0.55; 0.89). Of the observations with agreed ratings, 41 (67%) players were judged as performing the exercises as prescribed.
Conclusions: The observational checklist demonstrated high inter-rater reliability. Many players observed did not perform the exercises as prescribed, raising concern as to whether they would be receiving anticipated program benefits. Where quality of exercise performance is important, evaluation and reporting of program fidelity should include direct observations of participants.

1. Introduction

Exercise-based programs to prevent injuries in team sport have gained considerable interest in the last decade.[1–3] However, these programs can only be effective if they are delivered, and players complete them, as they were originally intended.[4] In implementation science, this is referred to as balancing fidelity with adaptation; fidelity is the extent to which a program is followed as prescribed, and adaptation is the extent to which a program is changed after implementation in a real-world setting.[5,6] Evaluation of fidelity provides insight into why a program succeeded and which components were of value, or why it might have failed to change outcomes.[7,8] Importantly, this evaluation also helps prevent incorrect conclusions being drawn about the effect (positive or negative) of a program on a given outcome.

Sports injury prevention programs (SIPPs) need to consider both exercise fidelity and program fidelity. To obtain SIPP benefits, players are instructed to perform the exercises as prescribed, i.e. with exercise fidelity. However, the extent to which exercise fidelity can be achieved is dependent on a range of moderating factors for how the program is delivered, received and executed, i.e. program fidelity (Fig. 1).[7,9] In many exercise-based SIPPs, a detailed description of the exercise intervention, often provided through training manuals, has been considered sufficient to enable coaches/trainers to understand and subsequently deliver the intervention appropriately. Training manuals are generally accompanied by education sessions.[10–12] It is assumed that with these resources, coaches/trainers can deliver the exercises correctly and players can understand and execute the exercises accurately. These exercise fidelity assumptions have rarely been evaluated or reported.

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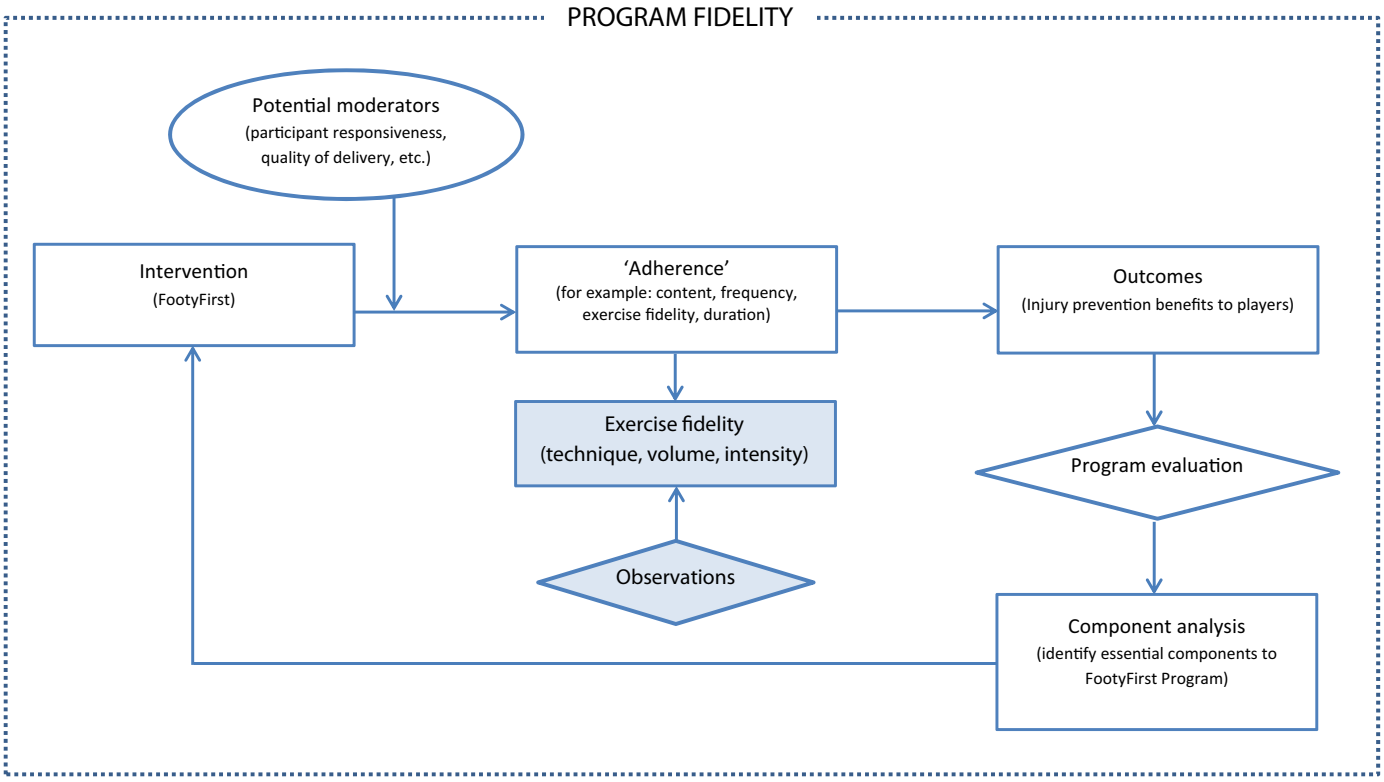

Fig. 1. Observations of exercise fidelity within the framework of evaluating FootyFirst program fidelity (based on the original implementation fidelity framework of Carroll[7]).

When reported, evaluation of program fidelity has generally been limited to self-reported measures of frequency of exercise performance.[7,13] These measures involve a researcher surveying participants with a question such as 'was the exercise programme performed and, if so, how often?' For example, in a study of compliance with a training program in youth soccer, the coaches kept a record of whether: (a) the team performed the warm-up program as part of their training session; and (b) individual players participated in this team warm-up.[14] Assessing participation through self-reported measures can give rise to two forms of bias: (a) recall bias, if asking players/coaches to report events over an extended prior period, e.g., month or season; or (b) social desirability, whereby respondents may provide more favourable answers to satisfy the perceived researcher interest.[15] To counter this, some studies have engaged data collectors to independently record whether coaches deliver[12] or players participate[16] in a program fully, partially or not at all. While this improves monitoring of the extent of participation, the data still gives no insight into how well the players perform the exercises, i.e. exercise fidelity. To our knowledge, there has been no published direct observational assessment of exercise fidelity prescribed as part of any exercise-based SIPP and, as such, there are no observational audit tools published for this purpose.

The National Guidance for Australian football Partnerships and Safety (NoGAPS) project aims to understand how sports injury research and prevention efforts can be better translated into community sport settings.[17] A major component of this project involves the development, implementation and evaluation of an evidence-informed SIPP, "FootyFirst," to prevent lower limb injuries in community Australian Football (AF). To aid the evaluation of overall program fidelity for FootyFirst, a checklist was required, and subsequently trialled, to objectively assess player exercise fidelity. The aim of this paper is to report the development, trial and testing of the inter-rater reliability of this observational fidelity assessment tool. Specifically, a checklist was designed to assess the degree to which observed players performed each exercise component within FootyFirst compared to how it was originally prescribed.

2. Methods

FootyFirst is an evidence-based and context-informed lower-limb SIPP that has been developed specifically for community AF. The FootyFirst exercises were developed by the research team and refined by content and context experts, and AF-industry partners. In short, FootyFirst begins with a general, 10-minute warm-up program of 12 exercises, including run-throughs and dynamic stretches. This is followed by lower-limb strength and conditioning exercises/drills to enhance balance, landing and side-stepping techniques (e.g., hamstring lowers, planks and side-stepping evasion skills). Each exercise has five levels of progression, with players encouraged to start at level 1 and progress to subsequent levels as their strength, muscular endurance, balance and flexibility improve. FootyFirst was designed to take 20 min and to be a replacement for, or accompaniment to, existing warm-ups used in twice-weekly, training sessions. The program is presented in a manual, posters and videos, (available from the authors on request). Performing all FootyFirst exercises with correct technique, volume and intensity is considered essential to ensure the full program benefits are gained.

Using the FootyFirst program manual and videos as references, each individual exercise was described according to essential performance criteria under exercise prescription categories of technique, volume, and intensity, as described in American College of Sports Medicine guidelines.[18] For example, in the hamstring lower exercise, the essential criteria were: technique – *lean forward from knees*, *keep body as straight as possible*; intensity – *slowly lean forward*, because the player is trying to resist gravity by using the hamstrings in an eccentric contraction; and volume – initially *6 repetitions* and increases through the levels to *2 sets of 12 repetitions*.