Journal of Bodywork and Movement Therapies (2007) **11**, 106–110

ELSEVIER

Journal of
Bodywork and
Movement Therapies

www.intl.elsevierhealth.com/journals/jbmt

LITERATURE REVIEW

The effectiveness of Pilates training in healthy adults: An appraisal of the research literature

Lisa Marie Bernardo, Ph.D., M.P.H., R.N., H.F.I.*

University of Pittsburgh School of Nursing, 225 Victoria Building, Pittsburgh, PA 15261, 412 624-7637, USA

Received 13 July 2006; accepted 8 August 2006

KEYWORDS
Pilates;
Healthy adults;
Research options;
Literature review

Summary Pilates has gained momentum and attention in the past 5 years as a modality for improving flexibility, strength and mind–body awareness. What is not revealed, however, is the scientific basis for this practice. The two-fold purpose of this review was to (1) critically appraise published research on Pilates in healthy adults and (2) propose future research options for this method in healthy adults. An extensive literature search was conducted, using *Pilates* as the search word. A total of 277 articles were found. Thirty-nine articles and abstracts were published in refereed, professional journals, of which there were only three clinical trials in healthy adults. The strengths of these three clinical trials were the (1) use of established measurements for stated outcomes and (2) documented need for research in this area. The weaknesses were (1) lack of true experimental designs, (2) small sample sizes, and (3) lack of a defined method of Pilates. There is cautious support for the effectiveness of Pilates in improving flexibility, abdominal and lumbo-pelvic stability and muscular activity, primarily due to a lack of sound research methodology surrounding each study. Utilizing a true experimental design and stating the Pilates method utilized can strengthen and improve future Pilates research in healthy adults.

Introduction

Pilates is a mind–body fitness program gaining in popularity and acceptance within the fitness community. Named after its founder, Joseph H. Pilates, and detailed in his publications (Pilates, 1934, 1945), this fitness program incorporates the use of special apparatus and equipment into movement routines designed to enhance flexibility, strength, and coordination. Pilates is advocated as a beneficial exercise method in adult populations (Reyneke, 1993; LaBrusciano and Lonergan, 1996; Latey, 2001, 2002; Stanko, 2002; Muscolino and Cipriani, 2003a, b; Smith and Smith, 2004).

With this ongoing interest in and support for Pilates as an exercise method in healthy adults, an established scientific framework based on evidence

*Tel.: +1 412 624 7637; fax: +1 412 383 7293.
E-mail address: LBE100@pitt.edu.

1360-8592/$ - see front matter © 2006 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jbmt.2006.08.006

from research studies would be expected. To learn more about the scientific basis for Pilates, a literature search and critical appraisal of the published research were undertaken to answer the question: What is the evidence for Pilates as a method of exercise in healthy adults?

Method

An electronic and paper literature search was conducted using the OVID search engine. Data bases searched were Medline, Allied and Complementary Medicine (AMED), Cumulative Index to Nursing and Allied Health Literature (CINAHL), SportsInfo, and the Cochrane Database of Systematic Reviews. Journal articles published from 1990–2005 were searched. The key word searched was *Pilates*. Articles were retrieved for appraisal if they were human subjects research published in refereed, professional journals. A total of 277 articles and abstracts were identified. No meta-analyzes or systematic reviews were found. Table 1 outlines the distribution of published Pilates articles.

Only 10 (3.9%) research studies were published in refereed, professional journals. Of these, five research studies were conducted in dancers and gymnasts (Fitt et al., 1993; Parrott, 1993; McLain et al., 1997; Hutchinson et al., 1998; McMillan et al., 1998); two studies were conducted in special populations (Savage, 2005; Mallery et al., 2003); and three studies (1.08%) conducted in healthy adults (Herrington and Davies, 2005; Segal et al., 2004; Petrofsky et al., 2005). These three studies are reviewed and appraised.

Literature review of the three published studies

Herrington and Davies (2005) conducted an observational study to assess and compare the contraction of the transversus abdominis muscle among healthy females trained in Pilates, traditional abdominal curls and a control group. Thirty-six healthy females (mean age = 32.6 years) served as the study subjects who were divided into three groups. Twelve were categorized as Pilates trained, based on their attendance of one or two 45-min Pilates classes each week for a 6-month period. Another 12 subjects were categorized as abdominal curl trained, having attended 15-min abdominal curl classes, once or twice weekly for 6 months. The last 12 subjects did not practice Pilates or abdominal curls. To indirectly measure contraction of the transversus abdominis muscle and to monitor lumbar–pelvic stability, a stabilizer pressure biofeedback unit (Chattanooga Group Inc.) was employed. A tester, blinded to group category, conducted the measurements.

Results indicated that 10 (83%) Pilates group, 4 (33.3%) abdominal curl group and three (25%) control group subjects passed the transversus abdominis stability test. Overall, less than half of the 36 subjects ($n = 17$, 47%) passed this test. For the lumbar–pelvic stability test, only 5 (42%) Pilates group subjects passed this test, with all others failing this test, leaving 14% overall who were able to stabilize the lumbar–pelvic area. The authors concluded that females who train in Pilates may be better able to recruit and utilize their deep abdominal muscles and stabilize the pelvic area compared to those not trained in Pilates.

Segal et al. (2004) conducted an observational, prospective, repeated measures study to assess the effects of Pilates training on flexibility, body composition, and health status of healthy adults. A power analysis was calculated for a sample size of 16 subjects. Adult members of a health club (31 women (average age = 41 years) and one man (age 42 years)) were assigned into classes of 8–12 students. All subjects participated in 1-h weekly Pilates mat class for 6 months. Exercises progressed in difficulty. Outcomes measured at baseline, 2, 4 and 6 months were composite flexibility (fingertip-to-floor), body composition (height, body mass index (BMI), body mass, segmental fat, and lean body mass); perception of health and function

Table 1 Distribution of published Pilates literature.

No meta-analyses or systematic reviews were found
Seventy-one (25.6%) no match in the Ulrich's Periodicals Directory
Four (1.4%) published in foreign languages
Eighty-five (30.7%) trade magazines
Seventy-eight (28.1%) printed in consumer publications (magazines, newspapers, and newsletters)
Thirty-nine articles and abstracts (14%) published in refereed, professional journals

$N = 277$.