Resistance Training Perceived Exertion Scale Validation for Females (Intensity Estimation Trials)

Ibrahim Mufleh Dabayebeh *

ABSTRACT

The purpose of this study was to physiologically validate the newly Arabic (translated format) of OMNI scale for resistance training (OMNI- Resistance) at different exercise intensities using estimation paradigm. Method: Twenty five young female subjects performed latissimus pull-down (LP), knee extension (KE), and seated rowing (SR) resistance exercises. Subjects completed three sets of 10 repetitions of each exercise (at 25%, 50% and 70% of one-repetition maximal (1RM %). Rating of perceived exertion for the active muscles (RPE-AM) and for the Overall body (RPE-O) were measured for each exercise during the tenth repetition. Correlations of RPE and 1RM% at the final repetition were (.95-.96) and regression functions were statistically significant (p < .01). Differences between (RPE-O) and (RPE-AM) between intensities and at each site were examined using ANOVA for repeated measures. At all exercises, (RPE-AM) were higher than (RPE-O) (P ≤ .05). ANOVA showed a progressive intensity effect as 1RM% was increased (P<.01). The Arabic translated version of the (OMNI-RES) scale of perceived exertion concurrent validity is established. The scale may be used by young and healthy females for exercise programming and evaluation.

Keywords: Exercise Physiology, Exercise Intensity, Resistance Exercise, OMNI Scale of Perceived Exertion, Exercise Physiology Measurements.

INTRODUCTION

The use of Ratings of Perceived exertion (RPE) is recommended and accepted method in exercise testing and programming by the American College of Sport Medicine (ACSM, 95). Perceived exertion is the subjective intensity of effort, strain, discomfort, and/or fatigue that is experienced during physical exercise (Robertson and Noble 1997). The scales of perceived exertion offer a simple, practical, accurate and inexpensive tool for exercise intensity monitor and regulating. For years Borg’s RPE scale was established as an important tool in both the assessment and prescription of exercise (Borg 1962; 1998). The use of different RPE scales has been in practice for several kinds of indoor aerobic exercise equipments and outdoor activities all over the world. More recently, mode-specific (i.e. resistance training) scales are validated and employed during exercise and fitness evaluation (Robertson, 2003).

Most athletes, healthy and diseased individuals monitor their subjective exercise intensity during all kinds of exercises including sport training, exercise rehabilitation sessions and weight lifting. Cardiorespiratory, musculoskeletal and metabolic physiological mediators during exercise determine the intensity of the psychological interpretation (i.e. perceived exertion) of exercise intensity (Robertson, 2004a). The intensity of the subjective feeling of strain plays a key role in regulating exercise intensity and compliance to exercise participation. Thus, RPE use and understanding may determine the suitable training intensity and thus play a key role in the improvement of training status and health for all exercising populations. The basic elements of an efficient exercise program include intensity; duration and frequency of exercise that is suitable for the target population. Safety of exercise is determined in part by regulating the different elements of the exercise program particularly the intensity of exercise. During aerobic exercises, for example, heart rate is monitored to determine suitable intensity and thus the effectiveness of the exercise program. In resistance exercise, however, the determination of intensity of exercise may be more

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complicated. Monitoring resistance exercise intensity during fitness exercises may be challenging for exercise trainers, physical therapist and exercise participants. Using resistance exercise perceived exertion scales as an exercise prescription tool may be a suitable alternative. RPE resistance training scale allows the exercising individuals to express the intensity of the exercise based upon the feel of strain or effort of the performed exercise. Numerous investigations have stated that RPE is positively and linearly related to the physiological/ physical variable (i.e. lifted weight, heart rate, O2 consumption) ((Robertson, 2003; American College of Sports Medicine 2000). Borg scale is one of the most used of all existing scales to determine perceived exertion (Borg 1962; 1998). This scale has been used for different kind of populations including adults, children, and individual with disability and for different types of exercise and exercise modalities.

As the mechanical exercise intensity or exercise performance increases, both the physiological and perceptual exertion intensity increase (Robertson, 2004a). The individual decision concerning the intensity and the duration of exercise are based upon the relation between physiological and perceptual responses. Differentiated RPE was defined by Robertson (2004a) as an RPE assigned specifically for some anatomical areas such as the arms, legs, and/or chest. Differentiated RPE estimates the perceptual intensity as it relates to specific anatomical location as the dominant origin or source of the feeling of fatigue (i. g. legs, chest, arms and active muscle). The specific intensity of perceived exertion (i.e. differentiated RPE) for certain exercise modalities (e. g. biking, running...etc) have been indicated recently to be more accurate in prescribing exercise intensity. Robertson (2004a) developed OMNI Pictures System which consists of a set of scales of perceived exertion using exercise specific-pictures (images) and verbal expressions describing the intensity of strain to enable exercisers to rate their level of exertion more precisely. OMNI Scale for Resistance Exercise is one of the used scales in the OMNI Picture System which has rating format that comprises both pictorial and verbal descriptions located on a narrow numerical response ranged (from 0 to 10) (Figure1, Robertson, 2003, Reprinted with a written permission of the original author Dr. Robertson). The first and original OMNI scale for children (Robertson, 2000) has gained an international recognition in the fitness, clinical and educative settings and was translated (validated) in different languages, backgrounds and cultures including African American, Caucasian American, French, Irish, Chinese, Malay, Indian and Arabic (Robertson, 2000, Finnegan, 2004, Balasekaran, 2008, Dabayebeh, 2010). Borg and OMNI scales of perceived exertion were prepared originally in English language format. They were used by practitioners in different languages immediately after literary translating them into different languages without going through the validation stage of the translated version of the scale (Mitsumasa 1986, Leung 2002). Because of the focus on verbal expression and the linguistic/cultural differences, literal translation of expressions may impose an important limitation in the use of such translated scales (Mitsumasa 1986). Several researchers developed, translated and/or validated the old version and new and more adaptive scales to be used (i.e. Children specific OMNI scales, Robertson, 2000; Adult Cycling OMNI Scale, Robertson (2004); Children’s Effort Rating Table (CERT), Williams (1994); OMNI Scale, Balasekaran (2008); Pictorial Curvilinear Ratings of Perceived Exertion Scale, Eston (2009); Arabic OMNI Scale for Children, Dabayebeh (2010). The OMNI Picture System in general and the OMNI Scale for resistance training of perceived exertion in specific have been developed to resolve certain limitations related to the specificity of training and therefore to the sensitivity of the scale for exercise intensity. To date, no studies have reported the validation and use of RPE in resistance exercise for females in Arabic language. And thus, it is yet to be determined whether or not RPE presented in OMNI-Resistance exercises is a valid exercise intensity prescription and measurement tool. The present study was undertaken to apply and examine the validity of the newly translated version of the OMNI-Resist scale (Figure 1) of perceived exertion in Arabic language using different exercise intensities. Similar to the original OMNI-Resist scale Robertson 2003 (Figure 1), the newly Arabic version of the OMNI Scale was developed in this investigation using pictorial, verbal description and numerical response ranging from 1-10 (Figure 2) with permission of the original author and founder of the OMNI pictorial system Robertson (2004a).

Robertson et al. (2003) suggested that exercise participants may be able to assign a number to some expressions describing their feeling of exertion in a more precise manner. Some expressions that are used in one culture may not be necessarily used by a different culture...
in the same manner. The present study has been designed to develop a resistance training specific scale of perceived exertion in Arabic language based on the originally validated and well accepted OMNI-Resistance exercise scale (Robertson, 2003). In this investigation, the Arabic version (translated) scale has been designed exactly similar to the original OMNI scale (Figure 1). Most perceived exertion scales assume linear function between perceptual (RPE) and physical (lifted weight) variable. Exercise physiology studies, exercise programs, and clinical setting have used the physical work cues such as lifted weight to indicate the exercise intensity and to validate different scales (Robertson, 2003). OMNI-Resistance exercise scale may be used in exercise for both genders and in clinical settings and offers a valuable and practical tool to control the exercise intensity for different populations of adult using easy terminology and simple images (Robertson, 2003). Most previous research in perceived exertion and resistance exercise used only male subjects (Garbutt 1994, Lagally, 2002, Pincivero, 1999, Suminski, 1997). It has been also suggested by some investigations that the subject’s sex may have a mediating role in RPE (Pincivero, 2001, Pincivero, 2000). Thus, it is important to establish the validation of the scale for both genders separately. The validation of the Arabic version of this scale for male subjects has been established in a previous investigation (Dabayebeh, 2011b). As of today, the Arabic exercise scientific literature lacks knowledge concerning perceived exertion in general and perceived exertion scales in particular. Limited previous use of perceived exertion has been established upon scientific application and validation of the internationally known scales (i.e. OMNI and Borg) in Arabic language (Dabayebeh, 2010a; Dabayebeh, 2010b, Dabayebeh, 2010c; Dabayebeh 2011a; Dabayebeh, 2011b). The present research examines the use of perceived exertion and explores this relatively new area in Arabic language. The purpose of this study is to validate the translated version of OMNI-Resistance Perceived Exertion Scale for non-differentiated (RPE-overall) and differentiated (Active Muscle.) using different intensities for female subjects.

Figure 1. The Original Adult OMNI-Resistance Exercise Scale of Perceived Exertion (Robertson, 2003) Reprinted with a written permission of the original author Dr. Robertson

Figure 2. Arabic version of OMNI Resistance Exercise Scale of Perceived Exertion, Reprinted with a written permission of the original author Dr. Robertson
METHODS

After obtaining Dr. Robertson permission, similar verbal descriptions to the original English scale (Robertson, 2003), development steps of Arabic OMNI for cycle ergometer (Dabayebeh, 2010c) and similar wording and images of the Arabic OMNI scale (Dabayebeh, 2011a) were used.

Twenty five females participated as subjects (exercise science university students). Table 1 shows subjects descriptive characteristics. Subjects of the study volunteered to participate in this experiment after the approval of the faculty of sport sciences. Prior to participation, a consent form was signed, and a current health questionnaire was completed by each one of the subjects. All subjects were asymptomatic of illness or disease and free of acute or chronic injuries. Benefits and/or risks of participation in this experiment were explained to the subject.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Females (N:25) Mean±(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age(yr)</td>
<td>20.68±(2.7)</td>
</tr>
<tr>
<td>Weight(kg)</td>
<td>60.64±(8.41)</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>163.34±(9.51)</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>20.86±(4.38)</td>
</tr>
<tr>
<td>Waist: Hip Ratio</td>
<td>0.88±(0.08)</td>
</tr>
<tr>
<td>Fat%</td>
<td>18.52±(3.42)</td>
</tr>
</tbody>
</table>

The present investigation used perceptual estimation trials performed during an orientation session and three experimental sessions. Subjects were young healthy females who participated regularly in physical activity including some weight lifting activities. Experimental trials were performed in an exercise physiology laboratory using Life Fitness instruments (Life Fitness, USA). During the estimation trials, subjects blindly estimated the RPE based only upon the feeling of the strain and effort using the mentioned scale.

First laboratory session (Orientation trial): The first laboratory visit consisted of explanation of the experiment design and the purpose of the study, measurement of physical characteristics including skin fold and waist to hip (table1), instruction about the use of the scale and anchoring technique in which the participants had a clear idea about the low intensity exercises compared to the high intensity exercises (Robertson, 2003, Dabayebeh, 2011a), orientation of the used machines and standard lifting techniques, seat measurements determination, 1 RM determination, supervised practice effort estimation session for all studied muscle groups and for all intensities. Clear instructions about the use of RPEs included the definition of perceived exertion were given to the subjects during the orientation trial (Robertson, 2003). All questions and concerns of the subjects were answered during this session.

Second, third, fourth, fifth laboratory sessions: The experimental trials for these visits were similar. Exercise trials consisted of one sets of 10 repetitions for each of the three muscle groups (i.e. one set/ muscle group). Subjects performed one set of each (i.e. a total of three different sets/ session) of the following exercises (standard exercising machines, Life Fitness (USA)): latissimus pull-down (LP), knee extension (KE), and seated rowing (SR) using one of the randomly selected intensity (i.e.25% 1RM, 50% 1RM, 70% 1RM) during each visit. The exercise intensity (i.e. 25%, 50%, 70% 1 RM) for each muscle groups was different (i.e. selected randomly) for each exercise session. The newly translated Arabic version of OMNI-RES (figure 2) was employed to estimate the effort during these trials. Two separate ratings of perceived exertion (RPE) were determined (estimation) by subjects during each set of exercise. RPEs were determined during the last repetition of each exercise modality. RPE consisted of differentiated RPE (specific for the Active Muscle: RPE-AM) and non-differentiated (RPE in general for Overall body: RPE-O) similar to the methods of Robertson (2004b). During all the length of the exercise trial, the translated OMNI-RES (figure 2) scale was in full view of the subject (Robertson, 2000, Robertson 2003, and Dabayebeh 2011a).

DATA ANALYSIS

Linear regression analysis with repeated measures over exercise intensity (i.e. 25, 50, and 70% 1RM) for each of the exercise modalities was used to determine concurrent validity. Exercise intensity was established as the criterion and the OMNI-RES ratings of the active muscle during the final repetition were established as a concurrent. Regression coefficients were calculated for each one of the intensities according to the used instruments (i.e. exercising machines). The data was analyzed for three exercise intensities according to the sites of perceive exertion: overall body RPE (undifferentiated) and the
active muscle RPE (differentiated).

Two-factor (site X intensity (% 1RM)) ANOVA with repeated measures was used to examine main effect of the intensity on RPE-RES. Separate ANOVAs was analyzed for each exercise or muscle groups ((latissimus pull-down, knee extension, and seated rowing). For differentiated RPE, the analysis examined the differences in RPE between the different sites for each one of exercise intensities (% 1RM) separately (RPE differences for the same intensity between overall and active muscle).

RESULTS

OMNI-Resistance exercise RPEs responses in the present investigation and for each one of the investigated exercises (i.e. muscle group) are presented in figures 3, 4, 5. Repeated measurement ANOVA demonstrated that RPEs increased as we moved from the low to the moderate to the high intensities (P<0.01) for all muscle groups (i.e. latissimus pull-down, knee extension, and seated rowing and for both the differentiated and non-differentiated RPE (figures 3, 4, 5).

Figure 3. Descriptive results for the Arabic OMNI-Resistance exercise RPE of the Lat Pulldown exercise for the active muscle and for overall.

Figure 4. Descriptive results for the Arabic OMNI-Resistance exercise RPE of the Knee Extension exercise for the active muscle and for overall.
Differentiated perceived exertion (i.e. overall vs. active muscle) of the Arabic OMNI-Resistance exercise RPE scale in this study are presented in figures 3, 4, and 5. RPEs for each one of the investigated modality or muscle groups are included in each one of the figures. Data demonstrated that RPE changes at different exercise intensity levels for perceived exertion for the whole body (overall RPE) compared with the specific active muscle RPE. Repeated measurement ANOVA indicated that RPEs increased significantly for the active muscle when it is compared with the overall RPEs (P<0.5). These results were consistent for all exercises and at all different intensities. Linear regression analysis of RPE expressed as a function of exercise intensity (% 1 RM) for exercises are presented in table 2. Linear regression analysis showed a positive regression coefficient for all investigated exercises (P<0.01). Detailed data are presented in table 2 for all the exercises.

Table 2. Linear regression analysis of RPE-Resist (OMNI) expressed as a function of percentage of 1RM during: A) Lat Pull Down, B) Knee Extension, C) Seated Rowing exercises.

<table>
<thead>
<tr>
<th>Exercise</th>
<th>RPE Predictor</th>
<th>Slope</th>
<th>SEE</th>
<th>Intercept</th>
<th>SEE</th>
<th>R*</th>
<th>r²</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Lat Pull Down</td>
<td>RPE- Overall</td>
<td>.153</td>
<td>.004</td>
<td>-2.522</td>
<td>.217</td>
<td>.97</td>
<td>.95</td>
</tr>
<tr>
<td></td>
<td>RPE-Active M</td>
<td>.171</td>
<td>.007</td>
<td>-1.87</td>
<td>.352</td>
<td>.94</td>
<td>.89</td>
</tr>
<tr>
<td>B) Knee Extension</td>
<td>RPE- Overall</td>
<td>.165</td>
<td>.005</td>
<td>-3.108</td>
<td>.257</td>
<td>.96</td>
<td>.93</td>
</tr>
<tr>
<td></td>
<td>RPE-Active M</td>
<td>.189</td>
<td>.006</td>
<td>-3.157</td>
<td>.325</td>
<td>.96</td>
<td>.92</td>
</tr>
<tr>
<td>C) Seated Rowing</td>
<td>RPE- Overall</td>
<td>.160</td>
<td>.004</td>
<td>-2.700</td>
<td>.216</td>
<td>.97</td>
<td>.95</td>
</tr>
<tr>
<td></td>
<td>RPE-Active M</td>
<td>.170</td>
<td>.006</td>
<td>-2.094</td>
<td>.318</td>
<td>.95</td>
<td>.91</td>
</tr>
</tbody>
</table>

RPE: ratings of perceived exertion; SEE: Standard error of estimate. * P<0.01.
DISCUSSION:
The goal of the present study was to evaluate the validity of the newly translated Arabic version of the OMNI-RES at different exercise intensities for female’s population. Gender-specific validation seemed necessary because of the possible difference of physiological, neuromuscular, and performance factors between men and women (Robertson, 2003). Most previous validation investigations were applied on males only (Garbutt, 1994, Lagally, 2002, Pincivero, 1999, Suminski, 1997). The findings of this study confirmed the concurrent validity of the original OMNI scale of perceived exertion for resistance exercise (Robertson, et al. (2004b) and the translated OMNI scale of perceived exertion for resistance exercise (Dabayebeh, 2011a). The validation of the translated pictorial scale in the present study was evident for young adult females in Arabic language and culture similar to the results of males and females in American culture (Robertson, et al. (2004b) and males in the Arabic culture (Dabayebeh, 2011a). The results of the present study demonstrated that as the resistance exercise intensity increased through out the exercise test, the translated OMNI-RES scale RPEs were increased positively and linearly. Using different RPE scale (i.e. Borg’s CR 10), similar results were found by Pincivero (2000) and Pincivero (2001) for both male and female subjects. The present validation method is based upon the method of previous investigations which have used physiological parameters to validate perceptual scales (Williams, 1994, Morgan, 2001, Duncan, 1998, Robertson, 2003, Robertson, 2002, Balasekaran, 2008 and Dabayebeh, 2010c). This study is the second investigation to validate RPE scale for resistance exercises in Arabic language and in Arabic culture in general, and the first to validate this scale in female’s population. The use of pictorial and verbal scale is relatively new even in the English language. OMNI RPE scales are considered among the first to use pictures, numbers and verbal expressions to indicate the perceived exercise intensity (Robertson, 2002).

In agreement with previous reports, the results of this study showed that the translated RPEs for the active muscle used in all of the investigated muscles and exercises were distributed as a positive and linear function of the physical criterion indicated by % 1RM (Pincivero, 2000, Pincivero, 2001). The linearity results are in agreement with the original investigation of OMNI-RES scale for resistance exercise (Robertson, 2003) and the results of the Arabic OMNI-Resistance exercises validation for male’s population (Dabayebeh, 2011a). The linear regression results of the present investigation is also consistent with previous research using OMNI scale format in different cultures, languages, adults, children, males and females (Robertson, 2000, Finnegan, 2004, Robertson, 2004a, Robertson, 2003, Roemmich, 2006, Balasekaran, 2008, Dabayebeh, 2010a). Similar to previous investigations (Robertson, 2003, Balasekaran, 2005, Balasekaran, 2008, and Dabayebeh, 2010, Dabayebeh, 2011a), the results of the present investigation show the linearity between exercise relative intensity and Arabic OMNI-RES RPEs. Eston et al. (2009), however, suggested that the child’s perception of exertion may increase curvilinearly with equal increments in work rate. Further investigation may be needed to examine the possibility of curvilinear increase in perception of exertion in adult for resistance exercises in different exercise modality and different scales.

Previous perceived exertion scales were validated using physiological parameters (Borg, 1973, Robertson, 1979, Williams, 1994, Finnegan, 2004, Eston, 2009, Dabayebeh, 2010a). In this investigation, the % 1RM (i.e. relative intensity) was used as a physical parameter similar to the studies of Pincivero, 2000 and Pincivero, 2001. Using the same format of the original OMNI scales, the present investigation indicated similar validation results compared to the absolute intensity used in previous Arabic OMNI scales for aerobic exercise using bike ergometer (Dabayebeh, 2010c, Dabayebeh, 2011b).

The present investigation adds a new dimension to the validation and future use of OMNI scale for resistance exercise. The original validation of the OMNI-Scale for resistance exercise was established using linear regression analysis for the total weight lifted and RPE (Robertson, 2003). The validation process in this investigation, however, used relative intensity (% 1RM) similar to the method indicated by several investigations (i.e. % 1RM, Pierce, 1993, Pincivero, 2000, Pincivero, 2001, and Suminski, 1997). Three relative workloads (i.e. 25, 50, and 70% of 1 RM) were employed in the present investigation to validate the newly translated version of the OMNI-RES scale. The original investigation (Robertson, 2003) employed only one relative exercise intensity (i.e. 65 % 1 RM). The exercise intensity in the present study seemed to cover a wider range of exercise loads similar to real application of resistance exercise.
Resistance Training Perceived Exertion Scale Validation for Jordanian Females and Males by Ibrahim Mufleh Dabayebeh

program in muscular fitness prescriptions. This may be important in prescribing strength and muscular endurance exercises during fitness classes for different populations in fitness and clinical settings.

Differentiated (anatomically recognized perceptual signals: active muscle) and undifferentiated (total body signals: overall) RPE responses validation results of the present study confirmed the results of the original OMNI-RES scale (Robertson, 2003) and the results of the male validation of the Arabic version of the scale (Dabayebeh, 2011a). Ratings for the active muscle in the present study was higher than the ratings overall body in all exercise modalities. The increased RPE for the active muscle was consistent at each level of relative exercise intensity (% 1RM). In addition, the increased RPE for the active muscle observed in this investigation is consistent with numerous reports using other exercise modalities and even different types of exercise (Robertson 2000, Robertson, 2003, Robertson, 2004a, Balasekaran, 2005, Balasekaran, 2008, and Dabayebeh, 2010, Dabayebeh, 2011a). In agreement with the results in the present study, previous aerobic exercise activities reports showed a higher active muscle RPEs such as legs RPE (i.e. active muscle) during treadmill (Utter 2002, Pfeifer 2002) and cycle ergometer (Robertson, 2000, Balasekaran, 2005, Balasekaran, 2008, and Dabayebeh, 2010c). Differentiated RPE validation in the present study may indicate the accuracy of the translated version of the scale to measure the specific source (i.e. dominant signal) of perceived exertion. RPEs may be used to regulate exercise intensity (Grange 2004, Buckley 2000). The result of the differentiated RPE in the present study comprises both the exercise of upper and lower body. The accurate differentiated RPE may improve the accuracy of the translated scale to determine the intensity in prescribing and monitoring resistance exercises. This is particularly important in the application of the scale as practical tool to determine exercise intensity during fitness classes, exercise programming and exercise evaluations.

**Conclusion**

Validation of the Arabic version of the scale is established for young recreationally trained female’s population performing upper and lower body weight lifting activities. This allows the use of this scale version in research, during exercise evaluation and as a modality to prescribe resistance exercise intensity during exercise sessions and fitness classes. The validation of the Arabic OMNI-RES scale in different population such as in rehabilitative exercise settings, different age groups using diverse methods (i.e. total lifted weight, production trials) is recommended for future investigations.

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مصداقية معيار تحديد الشدة الذاتية المدركة لتدريبات المقاومة عند الإناث (تجارب تقدير الشدة)

إبراهيم الديببة

ملخص

هدفت هذه الدراسة إلى التحقق من مصداقية المعيار (OMNI- Resistance) واللغة العربية من الناحية الفسيولوجية والجسمية لتقييم شدة تمرين المقاومة بشكل ذاتي وحسب الشعور (النماذج المدركة) عند الإناث. إجراء الدراسة: تم تطبيق هذا المعيار على عينه الدراسة المكونة من 25 طالبة من كلية علوم الرياضة المشاركين في مادة اللياقة البدنية، تضمنت الإجراءات اختبار قياس أقصى وزن يمكن حمله مرة واحدة فقط (1RM) وذلك تم تقدير ثلاثة مستويات مختلفة من الشدة النوعية تمثل الشدة الخفيفة (25%) والخفيفة (50%) والعالية (70%) من 1RM. لثلاثة أجهزة رياضية (مجموعات عضليّة) لتدريبات القوة وهي: السحب للأعلى (latissimus pull-down)، التجديف من الخلف (extension)، وضع الأحذة (seated rowing). تم تطبيق الأحمال الثلاثة ( مختلفات الشدة) بشكل عشوائي على الأجهزة الثلاثة وملاءسة تكرار لكل تمرين، تم الطبلا من أفراد الشعبة تقدير الشدة (النماذج أو الشدة المدركة) للعضلية العام والجسم ككل من خلال استخدام المعيار الذاتي خلال التكرار العابر لكل عمل.

النتائج: التحليل الإحصائي (الإحصاء 95-96.95%): وانحراف النتائج بين شدة التمرين (نسبة الوزن المحمول، 1RM) والجهد (الغرام) كاذبًا كانت دالة إجبارية (p≤0.01). نتائج تحليل ANOVA المقدر ذاتياً كانت دالة إجبارية (p≤0.01). النتائج تبين أن مجموع التمرين يعدل إلى أن هناك اختلافًا في تقييم الشدة الذاتي بناءً على المعيار بين الأحمال الثلاثة (الخصائص العضليّة) (50% و 70% من 1RM) مصمم الشعور بشدة التمرين للعضلية العامة كان أكبر من الشعور بالشدة لجسم ككل وفي جميع التمارين (p≤0.01).

الاستنتاجات: نتائج هذه الدراسة تشير إلى مصداقية المعيار الذاتي باللغة العربية ودقة في تحديد شدة العمل بشكل صحيح من قبل المتدرب، كذلك قدرتها على تحديد مستوى الجهد والصعوبة استخدامه خلال محاضرات وبرامج اللياقة البدنية والبحث العلمي.

الكلمات الدالة: فسيولوجيا التدريب الرياضي، معايير شدة التمرين الذاتي، نماذج المقاومة، برامج اللياقة البدنية.

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