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Dr. Anidev Singh
Student Activity and Sports Officer, National Institute of Technology Delhi, Delhi, India

Corresponding Author:
Dr. Anidev Singh
Student Activity and Sports Officer, National Institute of Technology Delhi, Delhi, India

The volume and intensity of physical activity correlates ratings of perceived exertion on female judo players on 12 min. run/walk paradigm

Dr. Anidev Singh

Abstract
The training, coaching and competitions depend on many factors but managing the load dynamics for justified adaptation requires a scientifically validated controlling mechanism to optimize the training and coaching load. The rate of perceived exertion is a tool to measure the level of exertion of an athlete during physical activity. The study was conducted to test the validity of ratings of perceived physical exertion with special reference to the physical activity of female judo players for which 30 female players were randomly selected and were asked to cover maximum distance in 12 minutes. Heart rate and RPE were recorded at an interval of each 200 meters of distance during running/walking testing protocol with performance in meters. The Mean, Maximum scores, Minimum scores, Standard deviation and Product moment Correlation were calculated and it was concluded that there is a significant correlation found between the rate of perceived exertion and other components such as Heart rate, velocity, and split time during the test.

Keywords: Heart rate, velocity, split time, perceived exertion, intensity

Introduction
Judo is a rapidly progressing in women than that of its counterpart, similarly, Indian women judo players demonstrated a better performance output, hence logically deserve better scientific support for training, coaching and competitions. The training, coaching and competitions depend on many factors but managing the load dynamics for justified adaptation requires a scientifically validated controlling mechanism to optimize the training and coaching load. Among the known controlled tools ratings of perceived exertion have a wide range of applications. Whether it is useful or not, that's why the research scholar has undertaken a study entitled "The Volume and Intensity of Physical Activity Correlates Ratings of Perceived Exertions on Female Judo Players on 12 Min. Run/Walk Paradigm" with the purpose "To test the validity of ratings of perceived physical exertion with special reference to physical activity of female judo player" and objectives (1) To correlate volume of physical activity and ratings of perceived physical exertion, (2) To correlate intensity of physical activity and ratings of perceived physical exertion, (3) To correlate exercise heart rate and ratings of perceived physical exertion, (4) To correlate exercise heart rate and volume of physical activity and (5) To correlate exercise heart rate and intensity of physical activity. The delimitations of the study are: (1) The study will be delimited to female judo players of IGIPESS at the age ranging from 17 to 24 years, (2) The proposed study will be delimited to the judo players who have at least intercollege participation and have one year of judo training, (3) The physical activity will be delimited to 12 min run/walk test to be conducted in 100mt straight, (4) The proposed study will be delimited to intensity of physical activity (distance covered per unit time on an average) and (5) The study will be delimited to volume of physical activity (running distance). The hypothesis drawn was that there will be a significant correlation between (1) Volume of physical activity and ratings of perceived physical exertion, (2) Intensity of physical activity and ratings of perceived physical exertion, (3) Heart rate and ratings of perceived physical exertion, (4) Heart rate and volume of physical activity and (5) Heart rate and intensity of physical activity.

Procedure and Methodology

Keeping in view the purpose and delimitations of the study, thirty (n=30) female judo players were randomly selected from university of Delhi. The inclusion criteria of the sample were (1) Willingness of the participants for the testing, (2) Each judo player has at least one year of judo training experience, (3) Each judo player has at least participated at inter-college judo competition and (4) The Age of female judo players were ranged from 17 to 24 years (mean ± sd), with mean age was 21.72 and mean weight was 53. Keeping in mind the series of related literature, modern trends, scientific authenticity, and administrative feasibility following variables were selected to meet the purpose of the study: (i) Height (centimetres),(ii) Weight (kilograms), (iii)Age(in years), (iv)Distance covered in 12 minutes (meters), (v) Exercise Heart Rate (beats/minute),(vi) Rating of Perceived Exertion, (vi) Intensity of Physical Activity (meters/sec), (vii) Volume of Physical Activity (meters). The latest scientific devices/instruments available at the biomechanical laboratory of Indira Gandhi Institute of Physical education of sports sciences (University of Delhi), which were imported, installed and calibrated by internationally reputed companies from abroad were use for the purpose of the collection of data. Various scientific equipments were used to collect the data such as lever based weighing machine, anthropometric rod, 1/100 stopwatch, polar heart rate monitor and well-marked 100 meters straight. The subjects were asked to cover a maximum distance in 12 minutes either by running or walking on well-marked 100mts straight (marked at an interval of 10 meters). Heart rate and RPE were recorded at an interval of each 200 meters of distance during running/walking testing protocol (refer table-1), as well as performance in meters (maximum distance covered). Each selected subject was oriented with the Borg test to response to their perceived exertion, at a regular interval of 200 meters of distance. The following statistical calculations were performed: (1) Mean, (2) Maximum scores, (3) Minimum scores, (4) Standard deviation and (5) Product Moment Correlation. To test the drawn hypothesis, the level of significance chosen was 0.05.

Analysis of Data and Findings of the Study

Table 1: Descriptive Statistics Matrix of Selected Variables

Variables	Minimum	maximum	Mean	Std. Deviation
st 200(Sec.)	59	86	7 2.00	6.89
v200 (m/s)	2.32	3.38	2.80	.28
hr200 (b/m)	153	193	172.27	8.93
rpe200(score)	3	9	5.95	1.43
st400(Sec.)	59	83	71.77	6.40
v400(m/s)	2.40	3.38	2.80	.26
hr400(b/m)	170	200	182.80	7.36
rpe400(score)	6	11	7.60	1.63
st600(Sec.)	61	90	73.53	8.00
v600(m/s)	2.22	3.27	2.74	.30
hr600(b/m)	170	203	186.13	7.70
rpe600(score)	7	13	9.10	1.86
st800(Sec.)	61	96	74.10	10.06
v800(m/s)	2.08	3.27	2.74	.36
hr800(b/m)	170	206	188.97	8.61
rpe800(score)	7	15	10.45	2.37
st1000(Sec.)	57	93	73.50	10.43
v1000(m/s)	2.15	3.50	2.76	.38
hr1000(b/m)	172	207	192.33	7.64
rpe1000(score)	8	16	11.40	2.16
st1200(Sec.)	58	115	73.20	13.44
v1200(m/s)	1.73	3.44	2.80	.44
hr1200(b/m)	169	208	192.33	8.96
rpe1200(score)	9	17	12.60	2.52
st1400(Sec.)	59	113	74.07	14.63
v1400(m/s)	1.76	3.38	2.78	.46
hr1400(b/m)	166	210	194.23	9.56
rpe1400(score)	9	18	13.75	2.67
st1600(Sec.)	40	92	68.14	10.95
v1600(m/s)	2.17	5.00	3.01	.54
hr1600(b/m)	169	216	197.5	9.37
rpe1600(score)	11	19	9	2.44
st1800 (Sec.)	57	89	15.35	9.07
v1800(m/s)	2.24	3.50	70.88	.37
hr1800(b/m)	186	222	2.86	8.72
rpe1800(score)	11	18	200.68	2.28
st2000(Sec.)	52	84	15.22	8.22
v2000(m/s)	2.38	3.84	70.58	.37
hr2000(b/m)	193	213	2.86	7.43
rpe2000(score)	12	18	204.36	2.25

(n = 30

Note 1: Values rounded to two digit of the decimal.

The major findings are (1) st200 found to be significantly related to v200 (r = -.994), whereas st200 found to be insignificantly related to hr200 (r = .053) and rpe200 (r = .004), v200 found to be insignificantly related to hr200 (r = -.046) and rpe200 (r = .048) similarly hr200 found to be insignificantly related to rpe200 (r = .210), (2) st400 found to be significantly related to v400 (r = -.995) whereas st400 found to be insignificantly related to hr400 (r = .120) and

rpe400 (r = .166), v400 found to be insignificantly related to hr400 (r = -.098) and rpe400 (r = -.129) similarly hr400 found to be insignificantly related to rpe400 (r = -.130), (3) st600 found to be significantly related to v600 (r = -.994) and rpe600 (r = .414) whereas st600 found to be insignificantly related to hr600 (r = -.211), v600 found to be significantly related to rpe600 (-.488) and insignificantly related to hr600 (r = .239) similarly hr600 found to be insignificantly related to rpe600 (r = -.002), (4) st800 found to be significantly related to v800 (r = -.993) and rpe800 (r = .484) whereas st800 found to be insignificantly related to hr800 (r = -.093) and,v800 found to be found to be significantly related rpe800 (r = -.499) and insignificantly related to hr800 (r = .120) and similarly hr800 found to be insignificantly related to rpe800 (r = .211), (5) st1000 found to be significantly related to v1000 (r = -.992) and rpe1000 (r = .424) whereas st1000 found to be insignificantly related to hr1000 (r = -.161), v1000 found to be significantly related to rpe1000 (r = -.305) and insignificantly related to hr1000 (r = .238) similarly hr1000 found to be insignificantly related to rpe1000 (r = .024), (6) st1200 found to be significantly related to v1000 (r = -.978) and hr1200 (r = -.492), whereas st1200 found to be insignificantly related to rpe1200 (r = .065), v1200 found to be significantly related to hr1200 (r = .491) and insignificantly related to rpe1200 (r = -.053) similarly hr1200 found to be insignificantly related to rpe1200 (r = .020), (7) st1400 found to be significantly related to v1400 (r = -.980) and hr1400 (r = -.755) whereas st1400 found to be insignificantly related to rpe1400 (r = .024), v1400 found to be significantly related to hr1400 (r = .757) and insignificantly related to rpe1400 (r = -.071) similarly hr1400 found to be insignificantly related to rpe1400 (r = .239), (8) st1600 found to be significantly related to v1600 (r = -.959) and hr1600 (r = -.509) whereas st1600 found to be insignificantly related to rpe1600 (r = .180), v1600 found to be significantly related to hr1600 (r = .549) and insignificantly related to rpe1600 (r = -.061) similarly hr1600 found to be insignificantly related to rpe1600 (r = .146), (9) st1800 found to be significantly related to v1800 (r = -.990), hr1800 (r = -.623) and rpe1800 (r = .455), v1800 found to be significantly related to hr1800 (r = .580) and rpe1800 (r = -.434) similarly hr1800 found to be insignificantly related to rpe1800 (r = .071), (10) st2000 found to be significantly related to v2000 (r = -.985) and hr2000 (r = -.592) whereas st2000 found to be insignificantly related to rpe2000 (r = .064), v2000 found to be significantly related to hr2000 (r = .513) and insignificantly related to rpe2000 (r = -.130) similarly hr2000 found to be significantly related to rpe2000 (r = .559).

Conclusion

From the findings following conclusions were drawn

1. The relationship between split time and ratings of perceived exertion was significant at distances of 600 meters, 800 meters, 1000 meters, and 1800 meters.
2. The relationship between velocity and ratings of perceived exertion were significant at distances of 600 meter, 800 meter, 1000 meter, and 1800 meter.
3. The relationship between heart rate and ratings of perceived exertion were insignificant at distances of 200 meters, 400 meters, 600 meters, 800 meters, 1000 meters, 1200 meters, 1400 meters, 1600 meters, 1800 meters and 2000 meters.
4. The relationship between split time and velocity was found to be significant at a distance of 200 meter, 400 meters, 600 meters, 800 meters, 1000 meters,1200 meters, 1400 meters, 1600 meters,1800 meters and 2000 meters.
5. The relationship between split time and heart rate was found to be significant at a distance of 1200 meters, 1400 meters, 1600 meters, 1800 meters and 2000 meters.
6. The relationship between velocity and heart rate was found to be significant at a distance of 1200 meters, 1400 meters, 1600 meters, 1800 meters and 2000 meters.

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