Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 1, January 2026, Pg. 215-222
DOI: 10.35724/mjpes.v1i2.1149

Glycemic Response And Cumulative Glucose After High Intensity Aerobic And Anaerobic Exercise In Athletes And Non-Athletes

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Abstract

Aim of current study Know response of blood sugar level and accumulative sugar after high intense aerobic and anaerobic exercises for practioners and non practioners -know differences between pre-post tests in blood sugar level and accumulative sugar after high intense aerobic and abaerobic exercises for practioners and non practioners Researcher hypothesized existence of morally significant differences in blood sugar level and accumulative sugar after high intense aerobic and abaerobic exercises for practioners and non practioners, existence of morally significant differences between pre-post tests in blood sugar level and accumulative sugar after high intense aerobic and abaerobic exercises for practioners and non practioners. Sample were (17) students who are enrolled in athletic activities and a similar number of non practioners who spend most time sitting from departments of geography and history both samples were chosen intentionally. Researcher used the following statistical tools means, standard deviation, t-test for irrelated samples , variance factor. Conclusions high intensity aerobic exercise (Bruce) and anaerobic one cause a moral variance in each of the following variables : number of breathing , heart beats , shrinking blood pressure, recess blood pressure, blood sugar. Both exercises didn't make moral variance in accumulative blood sugar.

Keywords: Glycemic Response, Cumulative Glucose, High Intensity, Aerobic.

Keywords:

1-Introduction:

Humans seek and cling to any opportunity to have a good life with good health. researches on athletes proved impact of high intense physical or aerobic exercise on metabolism of carbohydrates in muscles , using numerous ways and methods of training and measurement until fatigue while performing. researches also concentrated on nutrition and nutritional preparation for athlets on the same level with physical or professional preparation for athlets in various athletic activities www.iraq Sports Academy.

Need of specialists in athletic physiology and training increased to know importance of carbohydrates as an energy source during training of all kinds in 20th and 21st centuries , through laboratory or field studies to know all changes that happen during training depending on measuring biochemical changes in blood and muscles during aerobic and anaerobic exercise.

Blood sugar or glocuse is a basic element in producing energy in all important biological interactions to stabilize blood cells in life and to do required activities that will in sum represent how body works mentally and physically .Blood glocuse as well as klikogene of muscles are main energy source for muscles at the beginning of exercise when blood supplies of oxygen are less than required. participation of blood glocuse and blood klikogene increase with intense of physial effort .It is known that in extreme intenses or near extreme intenses, carbohydrates blood glocuse and klikogene of muscles) are the main source to give muscles power. at this intensity, fats are excluded as a fuel (Abulullah , 1985,p10)

High intense aerobic exercise uses a certain amount of klikogene stored in muscles , this will increase efficiency of inculin for a certain period . inculin plays an important role in organizing glocuse transference from blood stream into general tissues of muscles , increase store of glikogene and substitute what is consumed during activity . Due to increase demand of glocuse by muscles during moderate physical activity , level of blood glocuse decreases , such decrease is substituted by time viatransferring stored glikogene in blood . muscle glikogene and blood glocuse are very important in forming what is known as ATP during muscle shrink . modern studies confirm their importance in long physical exercises . these studies also stated that muscle fatigue is result of decrease in muscle klikogene or blood glocuse (www.ShababNahda.com)

Exercises help to increase connectivity and integration of insulin in recipients found on cells of muscles making it easy for glocuse to enter muscles , proving that insulin is responsible for transmitting glocuse while training and these exercises increase its effect (Erik 1981, p302)

Importance of research comes from knowing glocus rate in blood , following the changes in its rate in blood after exercise so that interested in physical education know how to decrease training burden , how to distribute physical effort for students in practical essons beginning from warming up throughout the whole course.

1.2 Goals of research:

1.2.1. Know Response of blood sugar level and accumulative sugar after high intense aerobic and anaerobic exercises for practioners and non practioners

1.2.2.know differnces between pre-post tests in blood sugar level and accumulative sugar after high intense aerobic and abaerobic exercises for practioners and non practioners.

1.3 Hypotheses:

1.3.1. Existence of morally significant differences in blood sugar level and accumulative sugar after high intense aerobic and anaerobic exercises for practioners and non practioners

1.3.2.existence of morally significant differences between pre-post tests in blood sugar level and accumulative sugar after high intense aerobic and anaerobic exercises for practioners and non practioners.

2-procedures :

2.1.methodology : researcher adopted descriptive method due to its appropriateness

2.2society and sample :
Society was students of college of basic education university of Mosul. after that researcher limited society to be students of the following departments physical education and sport sciences – history and geography. Both groups (practioners and non practioners) were chosen on the following basis
-17 practioners were intentionally chosen
-17 non practioners were intentionally chosen
2.3.equation of research sample
Equation between both groups was done in the following variables (height/age/weight) as shown in table (1) variance factor showed accepted equation between sample members

Table (1)
Means and deviations for height , weight , age

Variances	Practioners			Non practioners		
	means	Standard deviation ±	Variance factor	Means	Standard Deviation ±	Variance factor
Height	176,411	5,350	3,117	170,794	4,870	2,851
weight	72,041	8,134	11,290	15,858	6,948	10,549
age	23,235	1,855	7,983	21,588	1,416	6,559

2.4.data collecting methods ;
Following appliances , tests , references , and measurements to collect data
2.4.1.tools
-height and wieght measuring device from medical scale detector brand / american
-upper arm electronic blood pressure device / china authorized by Madrid Spain S.A.H-Group
-japanese devie to measure blood glocuse / contour brand
-trademill / trackmaster brand / American
-one time use blood sugar measuring ribbons
-picking device to get a blood drop
-picking needle
-sanitizer
-2 digital timers to the nearest (1/10) persecond
2.4.2.tests and measurements
2.4.2.1.bodily measuremnts
2.4.2.1.1.measuring height (cm) and weight (kg)
Height and weight of sample were taken using height and wieght measuring device from medical scale detector . student stands barefooted on scale with her back on fixed metal poll then a team assistant records weight and moves metal plate to reach student's head to get height in cm
2.4.2.measuring physiological variables

1-taking heart beat and blood pressure
They were taken using digital device . shrinking and recess blood pressures as well as heart beat were found the traditional way . reading was done pre and post exercise
2-Glocuse concentration was taken pre and post exercise . sample fasted for (12) hours before test .measurement was done using blood glocuse monitoring – contour system) with chemical detetcing ribbons that give electric signal due to blood interaction . signal differs according to different glocuse concentrations of sample
-Steps : done the usual way to measure blood sugar
3-measuring accumulative sugar
Triglycerides were measured after taking blood sample form testees after (120 hours fasting , twice pre-post exercise using analysis device to findout (HBAIC)
2.5.physical test ;
2.5.1.aerobic exercise (Bruce test)
Aim ; to reach longest endurance time for testee
Tools : digital trademill with speed and steep scale
Preparation : testee warm up for (5) minutes by going on trademill to walk or jog with speed of (6km/h) steep (4%) and rest for (5) minutes
Conditions : test consists of (7) stages with a different speed and steep for each stage . every stage lasts for (3) minutes as shown on table (2)

Table (2)

features	stages	Total time	Steep%	Speed (km/h)
1	Stage 1	1-3	10%	2,47
2	Stage 2	3-6	12	4,02
3	Stage 3	6-9	14	5,47
4	Stage 4	9-12	16	6,76
5	Stage 5	12-15	18	8,05
6	Stage 6	15-18	20	8,8
7	Stage 7	18-21	22	9,7

2.5.2.high intense abaerobic exercise :
Running from flying phase for (60m) with an intense of (95%)
Aim ; to know maximum speed
Description ; run with maximum speed from flying phase for (60m) with least time
2.6.pilot experiment ;
Took place on Sunday 6/11/2022 on 11:00a.m. for 1 hour on sample so that sample members as well as assistants get accustomed to devices used , to measure all research variables except taking blood samples , to know obstacles that face researchers when carrying out main experience
2.7.main experience
Took place on Thursday 10/11/2022 in physiology lab of department of physical education and sport sciences / college of basic education and outer field of college . blood sample was taken from testees , blood pressure , pulse , glocuse , then student warmed up for (5) minutes rested for 2 then came physical test as shown on table (2) to get the student to her limit on trademill . after that team assistants took blood pressure , pulse and a second blood sample then measuring glocuse . all sample member did experiment fasting in the same steps for abaerobic exercise
2.8.statistical methods :
Researchers used the following statistical methods ;

Arithematic means
Standard deviation
t-test for irrelated samples
variance factor

3- Results

3.1 Results, discussion, and analysis

Table (3)

means , standard deviations , t-value , probability , error rate , morality of research variables

Variables	Means	Standard deviation	T value	Probability	Morality
Heart beat pre-exercise	8,05	10,7	18,8	0,00	Moral
Heart beat post exercise	14,01	6,5	18,8	0,00	Moral
Shrinking pressure pre-exercise	116,8	8,9	9,02	0,00	Moral
Shrinking pressure post exercise	141,3	3,9	9,02	0,00	Moral
Recess pressure pre-exercise	71,4	1,06	2,5	0,03	Moral
Recess pressure post exercise	69	9,3	2,5	0,03	Moral
Glocuse pre-exercise	89,70	6,46	9,9	0,00	Moral
Glocuse post exercise	101,35	24,72	9,9	0,00	Moral
Accumulative sugar level pre-exercise	4,90	0,27	0,7	045	Immoral
Accumulative sugar level post exercise	4,94	0,26	0,7	0,45	Immoral

Moral at (0,05) >level

Table (3) shows :

-existence of morally significant differences between research variables except accumulative blood sugar t- values were (-18,8 / -9,02 / -9,9) at probability of (0,00/ 0,00/0,03/0,45) respectively at (0,05) level

-no morally significant differences in accumulative blood sugar . t-value reached (0,7) at probability of (0,45) at false ratio of (0,05) .

Table (4)

Means, standard deviations , t-value , probability , error rate , morality of research variables for non athletes

Variables	Means	Standard	T value	Probability	Morality

		deviation			
Heart beat pre-exercise	80	10,7	19,1	0,00	Moral
Heart beat post exercise	16,01	7,5	19,1	0,00	Moral
Shrinking pressure pre-exercise	120,2	8,9	9,22	0,00	Moral
Shrinking pressure post exercise	165,4	4,9	9,22	0,00	Moral
Recess pressure pre-exercise	78,6	10,6	2,8	0,02	Moral
Recess pressure post exercise	75	9,34	2,8	0,02	Moral
Glocuse pre-exercise	94,23	12,83	10,5	0,01	Moral
Glocuse post exercise	87,35	8,14	10,5	0,01	Moral
Accumultaive blood sugar pre-exercise	5,5	0,29	0,9	0,48	Immoral
Accumulative blood sugar post exercise	6,1	0,30	0,9	0,48	Immoral

Moral at (0,05) level

Table (4) shows that :

-existence of morally significant differences between research variables except accumulative blood sugar , t-values reached (19,1/9,22/2,8/5,10) at probability levels of (0,00/0,00/0,02/0,01)

-no morally significant differences in accumulative sugar level . t-value was (0,9) at probability level of (0,48) at false rate of (0,05)

3.2discussing results

Regarding shrinking and recess blood pressures , heart beats there are morally significant differences in favor of post exercise for both samples due to impact of physical exercise on heart beat to increase oxygen intake while exercising . Fox (1984) says that there is a positive relation between speed of heart beat and intensity of physical exercise (Fox 1984,p176) . current research agrees with (Al-Saffar 2002) , (Alawi and Abdulfattah , 2000), (Gerard and Nicolas , 1984)and (Al-Dohuki ,2007).

Researcher attributes morality of glocuse for both samples that physical exercise lead to increase tissues ability to recieve more insuline , carry sugar particles and burn them inside cells. engaing in a physical effort body stops insulin hormon because there is need for glocuse in return some antihormones increases glogakon, catocolamin, cortezol ,and growth hormon (bahaj ahlamontada.com/t topic) .These hormones urge liver to decompose glicogene found in liver into glocus (to be source of energy) .some hormones help in preparing fatty acids to be used as fuel for muscles moreover increased concentration of catoclamin (specially during high intensity physical exercise) in blood contributes to make clicogene of muscles , the perfect fuel of shrinking muscles during the increased intensity of physical activity , physical activity decreases inslulin from pankerias leading to increased sensitivity of insulin recipients in muscles (Rvoti etal,1994,p35) , meaning that less amount of insulin becomes more efficient to let glocuse into muscle .Another thing helps to increase muscle's intake of glocuse in blood which is regular workout to increase glocuse transmitters through cell membrane (Paitakari et al,1997, p1055).

Workouts cause deep changes in glocuse sugar . exercises usually lower glocuse concentration in blood fast while abaerobics do just the opposite (Erik , 1981,p302)
Current research agrees with (Al-Hazaa ,2004) and a french study form Louis Pastor university (cf www.albawaba.com/ar).
Regarding immoral change in accumulative sugar of two samples , researcher attributes it to the fact that this variable is attached to surface of red blood cells .(AIC) results showed that mean of blood sugar in the past 2-3 months . specifically speaking (AIC) shows percentage of hymoglobin protiens in blood covered by sugar. hymoglobin protiens found in red blood cells moves oxygen . glocuse remains attached to hymoglobin through life circle of red blood cells that is usually (120) days (http://www.mayoclinic.org) so period of this test was ineffective regarding the rate of this kind of sugar.

4. Conclusions and Recommendations:

4.1.conclusions

-high intensity aerobic effort (Bruce) and and abaerobic effort brought a moral change in variables of (times of breathing , heartbeats , shrinking and recess blood pressures , blood sugar) for athletes

-high intensity aerobic effort (Bruce) and and abaerobic effort brought a moral change in variables of (times of breathing , heartbeats , shrinking and recess blood pressures , blood sugar) for non athletes

-high intensity aerobic effort (Bruce) and and abaerobic effort didn't have any moral difference on accumulative blood sugar for athletes

-high intensity aerobic effort (Bruce) and and abaerobic effort didn't have any moral difference on accumulative blood sugar for non athletes

4.2.recommendations

-compare results of current research on a sample of females

-measure more physiological variables like laktite due to its importance

-make current research in different temperatures

References

1-Al-Tikriti , Wadee' Yaseen and Al-Obaidi , Hassan Mohammed Abd (1999) : statistical appliances in researches of physical education .Darulkotb for printing and publishing , university of Mosul

2-Al-Dohuki , Azad Ahmed Khalid (2007) : effect of different recovery periods using positive and negative relaxation on some functional and biochemical variables and achievement after 400m run , unpublished Ph.D. treatise.college of physical education . university of Mosul

3-Al-Saffar,Ziyad Yonus Mohammed Hamawi (2002) , effect of repeating fencing competitions on a number of functional , biochemical ,professional and physical variables unpublished Ph.D. treatise.college of physical education . university of Mosul

4-Al-Hazaa,Hazaa Mohammed (2004) physical activity vs diabetes . magazine of food world . No.70

5-Abulullah , Ahmed Abdulfattah (1985) biology of athletic training .Darulfikr Al-Arabi , Cairo , Egypt

6-Alawi , Mohammed Hassan &Abdulfattah ,Abulullah Ahmed (2000) physiology of athletic training , Darulfikr Al-Arabi , Cairo , Egypt

7- Al-Hazaa,Hazaa Mohammed (2004) physical activity vs diabetes . magazine of food world . No.70

8-Adams , Gene ,M. (2002) , exercise physiology , laboratory manual , 4th ed.Mc Graw hill companies .Boston , U.S.A
9-Erik , A,Chter,M. (1981) Diabetes and Exercises .Boston Massachusets , Piscataway , NewJersey
10-Rvoti , R.et al(1994) the effects of non swimming water exercise and other adults . journal of orthopedic , sports physical
11-Paitkari et al (1997) association between physical activity and risk factors for coronary heart disease , the cardiovascular risk in younf Finns study . journal medicine and science in sport and exercise , vol.29 , no.8
12-Fox,E.L. (1984) sports physiology ,2nd ed. Saunders college publishing .Japan
13-Grand,J.&Nicholas ,P. (1984) principle of anatomy and physiology ,4th ed. Harper and Row publishers . NewYork
14-http://www.albawaba.com/ar
15-http://www.ShababNahda.com
16-https://arabicpost.net
17-bahaj.ahlamontada.com/t topic (iraqifs.coiraqifs.co
18-https://www.mayoclinic .org