Effect of Suggested Training Program on Numerical Level and Some Immunity Markers on 400 Meter Freestyle for Young Swimmers

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Abstract: Swimming is one of the most sporting activities which has effective impact on the body systems and its viability which characteristics with rapid dynamic work for arms and legs movements and the research aimed to know the effect of suggested training program on numerical level, some physical variables and significant of immunity for young swimmers. The research sample had been selected by intentional method from young swimmers at El Maadi club, registered at the Egyptian Federal for Swimming (11-12 year) and the number of sample had reached 12 young swimmers and 10 young swimmers had been selected for the pilot study. The suggested training program included 40 training units, 3 units weekly, particular data had been collected variables measurement had of the study, the researcher had followed statistic treatments (arithmetic mean-modular deviation-twist factor-medium-"T" test-calculating the percentage of change's rates). The most important results which the researcher reached that the suggested training program has a positive effect on the numerical standard and of immunity at research for 400-meter freestyle stroke the most important recommendations which the researcher recommended is the necessity good trainers car with good evaluation upon preparation of training programs and how to get the benefit from its impact on vital functions of the various organs of the body to achieve the best numerical level.

Key words: Immunity • Natural Killer • Leukocyte • Ig (Immunoglobulin)

INTRODUCTION

Swimming sport is distinguished as one of aquatics sports with different distance differs than other activities wherefrom the medium in which it is practiced and body position during the performance, breathing in addition to resulted functional variables about its practicing about searching for the best methods to access the highest levels of sports is the main focus for all swimming coaches the causes multiplicity of training methods and this needs permanent work by using the latest methods for creating a state of adaptation according to the swimmers event [1].

Recognizing the functional variables which take place inside human's body during performing a specific physical activity has an importance in describing and interpretation resulting functional changes concerning performing different training loads or its repetition and this will lead to understand biological basics and biological and chemistry which causes theses changes then it can be used to control and increase the efficiency of training programs [2]. And that means that the body's different organs change beginning with the cell and the whole body when performing the physical activity and this change takes a stable figure but there are some temporarily changes and these changes differ in its levels and its degree according to the quality and nature of practicing about searching for the best methods to access the highest levels of sports is the main focus for all swimming coaches the causes multiplicity of training methods and this needs permanent work by using the latest methods for creating a state of adaptation according to the swimmers event [1].

Athletes exposed to a lot of environmental factors and physical pressures represented in different training loads may affect positively or negatively on the blood defensive capability to face the infection and the diseases by the first line of defense (white blood cells "Leukocyte") and Immunity Mechanism Immunoglobulin [4]. And indicate that immunity is the body capability on severe strong resistance to any types of germs, or bacteria or pathogenic viruses and, its poisons and organic poisons to overcome them when infection by it so that protects the body from diseases [5].
The effect of training on the immunity system is one of the most important things to the athletic due to the important role that his system do while disease resistance and quick recovery from it, which increases by training and thereby the athlete lose his fitness and level decreases. So a lot of immunity system functions is in improvement as a result of moderate training unless the non-organized training comes with revere result [6]. The training effects on the immunity system for a large and positive effect that happened while organized training and causes some changes at Leukocyte (white blood cells) where from number and quality, where it increases it capability on defending the body then it increases Lymphocytes on division and increases number of all types of white cells during practicing sport especially non-violent moderate sports [7].

In spite that evaluated training programs are beneficial for immunity system and activate it, unless violent hoary trainings and not appropriate have its lateral effects on the immunity system such as increasing susceptibility to viral infection and premature aging and the incidence of tumors and diseases [8]. Clarifies throw analyzing information and facts about loading training and its effect on the immunity system showed that load which is higher than body capability declines the immunity system and retards B, T lymphoma cells and increases susceptible to infection [9].

The relationship between training and functions of the immune system is complex and may be appositive relation but that moderate training improves develops and increase activating cells of the immune system and thus have a strong line to prevention injury and disease [10].

And through the experience of researcher as an instructor and teacher at aquatic sports training department at the faculty of physical education and through her position as a first-class judge at Egyptian swimming federation as well as collecting of studies and research conducted in the field of swim training for young men that most of these studies were, working in developing training programs to improve numerical level and performance of short distances swimmers only) 50-100-200 meters also noted that the numbers of young junior swimmers young junior400 m freestyle ranged (5, 6 minutes) in addition to reducing immunity level and the weakness of the defense minute of the body to resist diseases which lauds to the "capability" to germ or bacteria and increase susceptibility to viral infection that prevents them from continuing in the, program despite the fact that training evaluated programs have proven scientifically to be useful to the immune system and from here come the idea of research about

**Objective:** The research aims to know the impact of the training program on:

- Numerical level of 400 meter freestyle for young swimmers.
- Some immunity's markers for immunodeficiency (IgA-IgM-IgG) and Rebound white blood (Leukocyte).

**Hypotheses:**

- Training program has a positive effect on numerical level 400 meter freestyle for young swimmers.
- The training program has a positive effect in some immunity's markers For immunodeficiency (IgA-IgM-IgG) and Rebound white blood (Leukocyte).

**MATERIALS AND METHODS**

The researcher has used the experimental method by using (pre-post) measurement on a single experimental group because it suits the nature of the research.

The research sample had been selected by intentional method from young swimmers at El Maadi club, registered at the Egyptian Federal for Swimming (11-12 year) and the number of sample had reached 12 young swimmers and 10 young swimmers had been selected for the pilot study for the following terms and conditions:

- Approval from each individual to make and perform the search experience and to take pre and post measurements.
- Medical check by the club medical doctor to ensure swimmer's health safety.
- Parity of the technical level of the members and individuals of the research sample in the level of performing at the four swimming strokes.
- Parity of the training age of the sample individuals.
- The Exclusion of young swimmers who joined the national team Researcher did homogeneity among the members of the research sample in the following measurements.
Table 1: Homogeneity among research sample in height, weight and age. N=12

<table>
<thead>
<tr>
<th>Variables</th>
<th>unit</th>
<th>Arithmetic mean</th>
<th>The Standard Deviation</th>
<th>Mediator</th>
<th>Torsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>Centimeters</td>
<td>148.9</td>
<td>3.45</td>
<td>148</td>
<td>0.78</td>
</tr>
<tr>
<td>Weight</td>
<td>Kg.</td>
<td>40.6</td>
<td>0.49</td>
<td>40.85</td>
<td>-1.5</td>
</tr>
<tr>
<td>Age</td>
<td>Year</td>
<td>11.7</td>
<td>0.45</td>
<td>12</td>
<td>-2</td>
</tr>
<tr>
<td>Training Age</td>
<td>Year</td>
<td>4.42</td>
<td>0.51</td>
<td>4.5</td>
<td>-0.47</td>
</tr>
</tbody>
</table>

Table 2: Homogeneity among research sample in (numerical level) to 400 m freestyle stroke. N=12

<table>
<thead>
<tr>
<th>Variables</th>
<th>unit</th>
<th>Arithmetic mean</th>
<th>Standard Deviation</th>
<th>Mediator</th>
<th>Torsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>numerical level to 400 m freestyle stroke</td>
<td>Sec.</td>
<td>5.42</td>
<td>0.17</td>
<td>5.33</td>
<td>1.59</td>
</tr>
</tbody>
</table>

Table 3: Homogeneity among research sample in (physiological measurements). N=12

<table>
<thead>
<tr>
<th>Variables</th>
<th>unit</th>
<th>Arithmetic mean</th>
<th>The Standard Deviation</th>
<th>Mediator</th>
<th>Torsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgG</td>
<td>Mg/dl</td>
<td>1180</td>
<td>105.2</td>
<td>1200</td>
<td>-0.57</td>
</tr>
<tr>
<td>IgA</td>
<td>Mg/dl</td>
<td>197.5</td>
<td>49.01</td>
<td>195</td>
<td>0.15</td>
</tr>
<tr>
<td>IgM</td>
<td>Mg/dl</td>
<td>225.9</td>
<td>74.9</td>
<td>250</td>
<td>-0.96</td>
</tr>
<tr>
<td>Monocyte</td>
<td>%</td>
<td>7.5</td>
<td>1.70</td>
<td>7</td>
<td>0.88</td>
</tr>
<tr>
<td>Lymphocyte</td>
<td>%</td>
<td>39.5</td>
<td>2.95</td>
<td>40</td>
<td>-0.29</td>
</tr>
<tr>
<td>Neutrophil</td>
<td>%</td>
<td>49.8</td>
<td>3.12</td>
<td>50.3</td>
<td>-0.48</td>
</tr>
<tr>
<td>Eosinophil</td>
<td>%</td>
<td>2.82</td>
<td>0.97</td>
<td>2.5</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Research Tools: To collect the necessary data the researcher had used the following instruments:

- Instruments (tools) and devices.
- Tests and Examinations. C-Training.
- The instruments (tools) and devices:
  - Restamiter: measure length to the nearest half cm.
  - Weighing scale: measure weight to the nearest half kilogram.
  - Stopwatch: to measure the time of performance (to the nearest 0.1 second).
  - Age: It had been measured by year to the nearest month by calendar year (A.D)
  - Discharge pipes and disinfectants in a private doctor analysis.
  - Questionnaire of experts’ opinion to determine the intensity, load and content of the program and the number of units (Attachment 1).
- Data form (Attachment 2).

Attachment 1: Suggested Training Plan for 11-12 years old stage

<table>
<thead>
<tr>
<th>Number of weeks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts of Season</td>
<td>General Preparation</td>
<td>specific Preparation and Competitions</td>
<td>Cooling down</td>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity</td>
<td>60%</td>
<td>70%</td>
<td>75%</td>
<td>75%</td>
<td>80%</td>
<td>85%</td>
<td>85%</td>
<td>75%</td>
<td>90-100%</td>
<td>95%</td>
<td>100%</td>
</tr>
<tr>
<td>Warming Up and cooling down</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Endurance Training</td>
<td>75%</td>
<td>75%</td>
<td>70%</td>
<td>70%</td>
<td>65%</td>
<td>65%</td>
<td>70%</td>
<td>60%</td>
<td>60%</td>
<td>65%</td>
<td>65%</td>
</tr>
<tr>
<td>Speed training</td>
<td>5%</td>
<td>5%</td>
<td>10%</td>
<td>10%</td>
<td>15%</td>
<td>15%</td>
<td>10%</td>
<td>20%</td>
<td>20%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Weekly Units</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Attachment 2: Registration Form for Swimmers Physiological Variable Data Registration Form the Research Variables

Name:……………… Age:………………

Height (Length):…… Weight:……………..

Physiological Variables

Measurement | IgG | IgA | IgM | Monocytes | Lymphocytes | Neutrophil | Eosinophil |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Tests:
**Numerical Level Test:** It had been recorded through the time of 400 meter freestyle swimming for young male and female swimmer by using stopwatch.

**Biological and Physiological Tests:** IgG-IgA-IgM-Monocyte-Lymphocyte-Neutrophil-Eosinophil had been measured with laboratorial analysis through drawing blood samples from young swimmers in the rest before applying the training program in the pre test and also in the post test after the completion of the study to determine the level of immunity in young swimmers by laboratory specialized doctor had analyzed blood samples.

**Training Program**

**Designing the Program:** The researcher had search at scientific references and studied (Arabian and foreign) which work at training programs particularly in the field of swimming training and she reached through it to design the suggested training program where it had chosen the program's content from different methods to achieve the study objective.

**Bases of Planning the Program:** The researcher had prepared Questionnaire of experts' opinion in sporting field (Attachment 1) which contains the following:

- Defining the total period of the program
- Training Objectives and duties and its priority in each stage from training season.
- the training program contained on periods (General preparation-Specific preparation and competition-cooling down)

**Statistical Treatments:** Achieving to the objective of the research and hypotheses of the research the researcher had used the following statistical methods:

- Arithmetic medium-standard deviation-bending-hosted-"T" test-percentage of change's rates.

**Executive Steps of the research and includes the following:**

**Pre Test:** it had been performed the pre test in all the variables of the study as follows:

- Anthropometric Tests dated 20/01/2009.
- Physiological Tests and measuring the numerical level of 400 meter freestyle swimming were done at the swimming pool at Maadi Club on 21/01/2009

**Executing the Research's Experiment:** The researcher had applied the training program during the period from 30/01/2009up to 15/04/2009 within 11 weeks which it is the total period of the training program and the researcher had unified the daily training appointments whereas to be three times weekly in the morning.

**Post Test:** It had been performed the Post Test with the same arrangement of performing Pre Test of physiological tests and measuring the numerical level of 400 meter freestyle swimming at swimming pool at Maadi Club on 16/04/2009.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre</th>
<th>Post</th>
<th>&quot;T&quot;</th>
<th>Change %</th>
</tr>
</thead>
<tbody>
<tr>
<td>numerical level to 400 m freestyle stroke</td>
<td>Sec. 5.42</td>
<td>0.17</td>
<td>5.13</td>
<td>0.04</td>
</tr>
</tbody>
</table>

The value of "T" shows at the level of 0.052.20=

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre</th>
<th>Post</th>
<th>&quot;T&quot;</th>
<th>Change %</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgG Mg/dl</td>
<td>1180</td>
<td>105.2</td>
<td>1478.3</td>
<td>66.03</td>
</tr>
<tr>
<td>IgA Mg/dl</td>
<td>197.5</td>
<td>49.01</td>
<td>248.8</td>
<td>45.6</td>
</tr>
<tr>
<td>IgM Mg/dl</td>
<td>225.9</td>
<td>74.9</td>
<td>316.5</td>
<td>43</td>
</tr>
<tr>
<td>Monocyte %</td>
<td>7.5</td>
<td>1.70</td>
<td>9</td>
<td>0.85</td>
</tr>
<tr>
<td>Lymphocytes %</td>
<td>39.5</td>
<td>2.95</td>
<td>44.4</td>
<td>3.05</td>
</tr>
<tr>
<td>Neutrophil %</td>
<td>49.8</td>
<td>3.12</td>
<td>54.25</td>
<td>3.20</td>
</tr>
<tr>
<td>Eosinophil %</td>
<td>2.82</td>
<td>0.97</td>
<td>3.7</td>
<td>0.25</td>
</tr>
</tbody>
</table>

The value of "T" at the level of 0.05=2.20
DISCUSSION

Table 5 describes the existence of significant differences between pre and post in favor to the experimental group in numerical level variable, as the mean pre test reached 5.42 and post measurement reached 5.13 and percentage change was 5.35. And the researcher explaining the improvement at numerical level at post measurement of the experimental group to increase functional efficiency and training status of the swimmers as a result of applying the training program whereas the researcher has the formation and regulation loads and sizes of training with match with research sample, as well as the use of methods of training (aerobic-anaerobic), which led to numerical level improvement for swimming 400 meters freestyle event. Freestyle event 400 meter depends on both aerobic (50%) and anaerobic (50%) [11]. These results agreed with findings reached by previous studies [12-14] that applying evaluated training programs with defined loads, intensity and sizes lead to improve numerical level of swimmers as well as lead to the improvement in efficiency and functional training status for swimmers and especially the young category for both Girls and Boys, because it is the base of Egyptian clubs. And this had proved the correctness of the first hypothesis which states that: the training program has a positive effect on the numerical level in 400 meter freestyle stroke.

Also the results and conclusions of Table 5 confirm the existence of significant differences statistically between pre and post of experimental group in the physiological variables in favor of post measurement with an average IgG reached (1180) and mean reached (1478.3) and percentage change (25.3), pre mean IgA (197.5), post mean (248.8), percentage change (25.9), pre mean IgM (225.9), post mean (316.5), percentage change (40.1), pre mean Monocytes (7.5), post mean (9), percentage change (20), pre mean Lymphocytes (39.5), post mean (44.4), percentage change (12.4), pre mean Neutrophil (49.8), post mean (54.25), percentage change (12.4), pre mean Eosinophil (2.82), post mean (3.7), percentage change (31.2) and the researcher confirmed this improvement in physiological variables of post test with experimental group into the evaluated training program where if sports training and sports practice has been done according to proper scientific basis, it does not lead to a weakened at the immunity system, but on the contrary lead to the strengthening and improving of its efficiency defense [15-17]. The hard and non-evaluated training reduces Plasma Gelotamyin cycle and lack of concentration in the blood as it may lead to muscle injuries as a result of load and any injury may lead to a reduction its discharge and thus decrease in immunity [18]. This goes with previous studies which referred to increasing the standard of immune bodies IgG, IgM after the balanced training season [4,19].

CONCLUSION

From the data existed and information concluded by the researcher, in the light of theoretical studies and similar researches, in limits of the sample and the nature of the objectives of the research and through the discussion and explanation of the results, the researcher achieved the following conclusions:

- Using the training program led to improve of the numerical level to 400 m freestyle stroke.
- Using the training program led to increase of indicators of immunity in swimmers.

Recommendations: In the light of the results shown, the researchers recommended the following:

- Making use of the suggested program as it has a positive effect on numerical level and physiological measurements.
- Similar studies are to be conducted on other age of young swimmers in higher levels swimming and other sports.
- Coaches should consider good balance among intensity, size and rest intervals when preparing training programs.

REFERENCES