99 - ANALYSIS OF UPPER RESPIRATORY TRACT INFECTION INCIDENCE IN WHO PRACTICE SWIMMING IN SWIMMING POOL WITH AND WITHOUT COVERING AND SEDENTARY

ANA CAROLINA DE OLIVEIRA LAIGNIER [1], FERNANDA GUSMÃO VIOTTI BALTHAZAR DA SILVEIRA [1]
SHEINLE CARLA DUTRA [1], GUILHERME DE AZAMBUJA PUSSIELDI [1 2]
1 - Centro Universitário Belo Horizonte UNI-BH / Belo Horizonte / Minas Gerais/ Brasil
2 - Universidade de Itaúna / Itaúna / Minas Gerais / Brasil
pussieldi@uit.br

INTRODUCTION

The mucosal membranes of the upper respiratory tract are the common local of infection (BLACK, 2002).

The Salivary IgA secreted is a predominant form of antibody that measured the imunological response in the mucosal surface (GLEESON, et al., 1999). The suppression level is associated with the volume, intensity and duration of the exercise. Low concentrations of salivary IgA are a predictive of a subsequent appearance of URTI symptoms in a short or long period (MACKINNON, 2000).

The model in "J" has been considered to describe the relation between the physical activity and the risk of the upper respiratory tract infection (URTI). This model suggests that the reduction of the URTI risk was found in individuals that practice moderate activity and that the URTI risk was bigger in physically inactive people and that they practice high intensity physical activity (MATTHEWS et al., 2002).

The regular moderate exercise increases the aerobic capacity and the salivary IgA concentration, what it provides the increase of the conditioning level and the reduction of the infection risk (KLENTROU et al., 2002).

The endurance athletes have a increased risk of upper respiratory tract infections during periods of intense training and competitive periods of two and three weeks (NIEMAN, 1997). According to Nieman and Nehlsen-Cannarella (1991), when athletes run above 40 km, the immunoglobulin serical falls for a period up to two days during the recovery and the ultramarathon can take to a great long and fall of the immunoglobulins serical levels when compared with short duration exercises (NIEMAN and NEHLSEN-CANNARELLA, 1991). During the immunosupression period, called as "open window", microorganisms, especially virus, can invade and the infection can be established. This is one of the causes for the effect of "overtraining" demonstrated in elite athlete, when the opening chance of patogens invade in higher level in this pronunciated immunossupression (PEDERSEN, ROHDE & OSTROWSKI, 1998).

Few studies correlate the upper respiratory tract infection incidence, exercise and environment, simultaneously. Walsh et al. (2002) had carried a study about salivary IgA response and long duration exercise in a cold environment with trained cyclists. It was concluded that the cold did not influence the IgA response, despite the levels of salivary IgA after exercise have been lesser in the group that was exercised in low temperature (6,4°C) in relation to the control group (19,8°C),. The reduction of the IgA concentration was caused by the reduction of the salivary secretion tax, possibly generated by dehydration.

Walsh et al. (2002) tells that previous studies had shown that in cold environment it has greater incidence of sinusite and upper respiratory tract infections, due to reduction of the mucosal temperature.

OBJETIVE

The objective of the present study is to verify if exists association between the URTI incidence, the practical environment of swimming (swimming pool with and without covering) and the sedentarism. Besides verifying the upper respiratory tractinfection incidence in active and physically inactive individuals and which of the environments, covered swimming pool or discovered, the swimmers would have minor URTI incidence.

METODOLOGY

Take part in this study one hundred and twenty individuals of both gender, being eighty perform regular swimmers and forty sedentary. The regular swimmers had been divided in two groups: swimming perfomers in discovered swimming pool (PD), and swimming performers in covered swimming pool (PC). The characterization of the sedentary individuals was in accordance with the ACSM classification. The sedentary volunteers had been aleatory chosen.

The present work was approved by the Ethical Committee in Human Research of the Centro Universitário Belo Horizonte, and all the volunteers had had that to sign the consent term of to participate of the cited research project.

The criteria for participation of the study had been: no-smokers, healthy, ages between 30 and 45 years, and could not live or work in environments with air conditioning.

TABLE 1
Age in years witn Mean and Standart Deviation

	Swimming Pool Covered(PC)	Swimming Pool Discovered (PD)	Sedentary (S)
Age (years)	35,3 ± 3,5*	35,5 ± 4,0	39,9 ± 4,1*

* significant difference between PC and S with $p \leq 0,05$

TABLE 2
Gender

	Swimming Pool Covered(PC)	Swimming Pool Discovered (PD)	Sedentary (S)
Men	17	24*	15*
Women	23	16*	25*
Total	40	40	40

* significant difference between PD and S with $p \leq 0,05$

The evaluations had been carried through between the months of March and April, in the west region of Belo Horizonte city of the swimming performers in covered swimming pool, and the Pampulha region, in Belo Horizonte city of the swimming performers in discovered swimming pool. It was guaranteed equal exposition to individuals to ambient conditions (climatic and infections exposition).

To the data collect was used the monthly illness form of Gleeson et al. (2000), with nine variables (as upper respiratory, chest infection, influenza, stress, headache, eye irritation, eruptions, skin abscesses, and others). The volunteers had filled during thirty and one followed days the infections signals and symptoms, in case that they presented them, classifying enters them: ligth, moderate and severe.

The individuals had been boarded in the place where they carry through physical activities. They had received the questionnaires (Monthly Illness Register Form) and instructions to fill them daily. After thirty and one days, the questionnaires had been returned.

The data analysis was carried through in accordance with displayed for Novas et al. (2003). The upper respiratory tract infrections incidence was evaluated from the quantification of the collected data. To the absence of illnesses symptoms value "0" was attributed, to the presence of illnesses symptoms, had been attributed to values in agreement severity: ligth "1", moderate "2" and severe "3".

An episode of upper respiratory tract infection was defined by a superior adittion "the 4" of signals/symptoms daily ones per three or more days, and with an interval of at the very least one week of a previous episode. The episodes counting was carried through for each individual of each group (PD, PC, S).

The upper respiratory tract infections incidence was analyzed by means of the Qui-square test, with the equal or lesser level of significance the 0,05 (p 0,05).

RESULTS AND DISCUSSION

It did not have estatistical differences between the upper respiratory tract infections incidence in swimmers individuals between the groups: covered swimming pool and discovered (Table 3), covered swimming pool and sedentary (Table 4) and discovered swimming pool and sedentary (Table 5).

TABLE 3
Upper Respiratory Tract Infection Incidence

Group	With infection	Without infection	Total
Covered swimming pool	7	33	40
Discovered swimming pool	2	38	40
Total	9	71	80

TABLE 4
Upper Respiratory Tract Infection Incidence

Group	With infection	Without infection	Total
Discovered swimming pool	2	38	40
Sedentaries	9	31	40
Total	11	69	80

TABLE 5
Upper Respiratory Tract Infection Incidence

Group	With infection	Without infection	Total
Covered swimming pool	7	33	40
Sedentaries	9	31	40
Total	16	64	80

In a Nehlsen-Cannarella (1999) study, the concentration of salivary IgA pre-exercise was 77% greater in rowers in relation to the sedentaries. This information contradicts the results presented in the present study, that they had shown that it did not have significant differences in the URTI incidence between sedentary and swimmers. The study of Gleeson et al. (2000), however, it demonstrated that relation does not exist between URTI incidence and the swimming training, confirming the results presented in this study.

However in another study of Gleeson et al. (1999) it presented a higher URTI incidence in physical activities performers. Nieman (2000) affirms that, between athlete and coaches the perception is common of that exhausting training and situations of overtraining reduce the resistance to the URTI. According to Gleeson et al. (2002), the URTI is the condition of infection more common than it affects the athletes who participate of an intensive training and can cause a serious disruption in the training programs and competitions. What it means that the URTI are more common in athletes highly trained (GLEESON, 2000).

The results of the present study can be explained by the moderate load of the activities carried through for the volunteers, who are not elite swimmers. Confirming this affirmation, Klentrou et al. (2002) they cite that the moderate and regular exercise increases the aerobic capacity and the salivary IgA concentration, what can provide an increase of the level of conditioning with lesser infection risk.

In the study carried through for Klentrou et al. (2002) also with moderate activities, the number of URTI and influenza symptoms diminished in the group that participated of a regular exercises program during 12 weeks. Gleeson et al. (1999) they had found in a study made with swimmers, who after the high intensity training, in swimming, had an increase in the infection risk of upper respiratory tract infection (URTI). A supposed cause of these alterations of the immunologicals parameters is the environment condition where they swim.

It did not have relation between URTI incidence and the environment where are swimming practice in our study. However previous studies cited by Walsh et al. (2002) they had shown that the URTI incidence has relation with environment, therefore in cold time increased the URTI due to the reduction of the mucosal temperature. What that was not seen in the study of Housh et. (1991) that it deal with the effect of the exercise in the salivary IgA levels in different temperatures, where had found that the moderate intensity exercise in temperatures between 6 and 34°C does not increase the susceptibility to the upper respiratory tract infection.

CONCLUSION

It is concluded that the URTI incidence does not have relation with the practice environment of the physical activity (covered swimming pool or discovered) and with swimming practice of moderate intensity in the months of March and the April, in the regions West and Pampulha in the Belo Horizonte city, Minas Gerais.

Other researches are suggested that controls others important variables, that not to did in the present study, as the water temperatures of covered swimming pools and discovered swimming pools, beyond the salivary IgA concentrations that they are important variables to confirm that results above.

REFERENCES

1. AMERICAN COLLEGE OF SPORTS MEDICINE (ACSM*). Teste de esforço e prescrição de exercício.* 5.ed. Rio de Janeiro: revinter, 2000. 314p.
2. BLACK, J.G. *Microbiologia*: fundamentos e perspectivas. 4.ed. Rio de Janeiro: Ed. Guanabara Koogan, 2002. 829 p.
3. BROOKS, G.F.; BUTEL, J.S.; MORSE, S.A. Jawetz. *Melnick & Adalberg:* microbiologia médica. 21. ed. Rio de Janeiro: editora guanabara Koogan, 2000. 611 p.
4. BURTON, G.R.W.; ENGELKIRK, P.G. *Microbiologia para as ciências da saúde*. 5.ed. Rio de Janeiro: guanabara Koogan. 1998. 289p.
5. GLEESON, M; MCDONALD, W.A.; PYNE, D.B.; CLANCY, R.L.; CRIPPS, A.W.; FRANCIS, J.L.; FRICKER, P.A. Immune status and respiratory illness for elite swimmers during a 12-week training cycle. *Int J Sports Med*. v.21, n.4, p.302-307. 2000.
6. GLEESON, M.; MCDONALD, W.A.; PYNE, D.B.; CRIPPS, A.W.; FRANCIS, J.L.; FRICKER, P.A.; CLANCY, R.L.

Salivary IgA levels and infection risk in elite swimmers. *Med Sci Sports Exerc.* v.31, n.1, p.67-73, 1999.
7. GLEESON, M. Mucosal immunity and respiratory illness in elite athletes. *Int J Sports Med*, v.1, n. 21, p. 33 43, 2000.
8. GLEESON, M.; PYNE, D. B.; AUSTIN, J. P.; FRANCIS, CLANCY, R. L.; MCDONALD, W. A. Epstein-bar virus reactivation and upper-respiratory illness in elite swimmers. *Med Sci Sports Exerc.*2001.
9. GLEESON, M.; PYNE, D.B. Special feature for the Olympics: effects of exercise on the immune system: exercise effects on mucosal immunity. *Immunol Cell Biol*. Oct; v. 78, n.5, p.536-544. Review. 2000.
10. KLENTROU, P., CIESLAK, T., MACNEIL, M., VINTINNER, A., PLYLEY, M. (2002). Effect of moderate exercise on salivary immunoglobulin A and infection risk in humans. *Eur. J. Appl. Physiol*. 87: 153-158.
11. NIEMAN, D.C. Immune response to heavy exertion. *J. Appl. Physiol*. v.82, n.5, p.1385-1394, 1997.
12. NIEMAN, D.A. Exercise effects on systemic immunity. *Immunology and Cell Biology.* n. 78, p. 496 501, 2000.
13. NIEMAN, D.C., NEHLSEN-CANNARELLA, S.L. The effects of acute and chronic exercise on immunoglobulins. *Sports Medicine*. v.11, n.3, p.183-201, 1991.
14. NEHLSEN-CANNARELLA, S. L.; NIEMAN, D. C.; FAGOAGA, O. R.; KELLN, W. J.; HENSON, D. A.; SHANNON, M.; DAVIS, J. M. Saliva immunoglobulins in elite women rowers. *Eur J Appl Physiol*, n. 81, p. 222 228, 2000.
15. NOVAS, A. M. P.; ROWBOTTOM, D. G.; JENKINS D. G. Tennis, incidence of URTI and salivary IgA. *Int J Sports Med*. v.23, n.3, p. 223-229, 2003.
16. PELCZAR JR, J.M.; CHAN, E.C.S.; KRIEG, N.R. *Microbiologia*: conceitos e aplicações. 2.ed. vol.1, São Paulo: Makron Books, 1997. 517 p.
17. PEDERSEN, B.K., ROHDE, T., OSTROWSKI, K. Recovery of the immune system after exercise. *Acta Physiol. Scan.* v.162, p. 325-332, 1998.
18. WALSH, N.P.; BISHOP, N.C.; BLACKWELL, J.; WIERZBICKI, S.G.; MONTAGUE, J.C. Salivary IgA response to prolonged exercise in a cold environment in trained cyclists. *Med Sci Sports Exerc.* v.34, n.10, p.1632-1637, 2002.

ANALYSIS OF UPPER RESPIRATORY TRACT INFECTION INCIDENCE IN WHO PRACTICE SWIMMING IN SWIMMING POOL WITH AND WITHOUT COVERING AND SEDENTARY

ABSTRACT

The aim of this study was to verify if it has association of the incidence of URTI with the fact to practice swimming in indoor and outdoor swimming pool, and with sedentary. The instrument for 120 voluntary individuals of both was used the genders, being 40 swimmers in indoor swimming pool, 40 swimmers in outdoor swimming pool and 40 sedentary, that they tell to its signals and symptoms of infections for a period of thirty and one days, classifying between light, moderate and severe signals the symptoms. The collected data had been quantified with punctuation to evaluate the incidence of infections of the superior respiratory treatment. The counting of episodes of infections of the superior respiratory treatment of the period of study of each individual in each group was made. The incidence of infections of the superior respiratory treatment was not different significantly between the groups. We concluded that the incidence of infections of the upper superior tract infection does not have relation with the environment of the swimming pool where if it swims (indoor or outdoor) and with the practice swimming in moderate intensity for this weather in this time of the year in the city of Belo Horizonte. **Key-words: Swimming**, Upper respiratory tract infection, Sedentary.

ANALYSE DE L'INCIDENCE D'INFECTIONS DES VOIES RESPIRATOIRES SUPÉRIEURES CHEZ LES ÉLÈVES PRATIQUANT LA NATATION EN PISCINE COUVERTE ET DÉCOUVERTE ET SÉDENTAIRES

RÉSUMÉ

Le principal objectif de la présente étude fut de vérifier s'il y a une association entre l'incidence d'infections des voies respiratoires supérieures (URTI), la pratique de la natation en piscine couverte, découverte et le sédentarisme. Cent-vingt individus volontaires des deux sexes participèrent à l'étude dont quarante pratiquants réguliers de natation en piscine couverte, quarante pratiquants réguliers en piscine découverte et quarante sédentaires. Pour recueillir les données, le Formulaire de Registre de Maladie Mensuel de Gleeson et al. (2000) fut utilisé, sur lequel les individus rapportèrent leurs signes et symptômes d'infections pour une période de trente-et-un jours, en les classant selon qu'ils soient légers, modérés et sévères. Les données recueillies subirent une ponctuation pour évaluer l'incidence d'infections des voies respiratoires supérieures. Le comptage d'épisodes d'URTI fut réalisé pour chaque individu de chaque groupe. L'incidence d'infections des voies respiratoires supérieures fut analysée au moyen du test Qui-quadrado, avec p 0,05. Il n'y eut pas de différence considérable d'URTI entre les groupes. On en conclut que l'incidence d'infections des voies respiratoires supérieures n'a pas de rapport avec le milieu où l'activité est réalisée (piscine couverte ou découverte) et avec la pratique de la natation à intensité modérée aux mois de mars et avril, dans les régions Ouest et Pampulha de la ville de Belo Horizonte, Minas Gerais. **Mots-clés:** Natation, Infections des voies respiratoires supérieures, Sédentaires.

ANÁLISIS DE LA INCIDENCIA DE INFECCIONES EN LAS VÍAS AÉREAS SUPERIORES EN ALUMNOS QUE PRACTICAN NATACIÓN EN PISCINA CON Y SIN COBERTURA Y SEDENTARIOS

RESUMEN

El objetivo de estudio fue verificar se existe asociación de la incidencia de URTI con el facto de practicar la natación en piscina cubierta, y con el sedentarismo. Fue utilizado el instrumento en lo cual los individuos voluntarios, sendo un total de 120 de ambos los géneros, siendo 40 practicantes regulares de natación en piscina con cobertura, 40 practicantes en piscina sin cobertura y 40 sedentarios, que relatan sus señales y síntomas de infecciones por un período de treinta y un días, clasificando entre ameno, moderado y severo los señales y síntomas presentados. Los dados fueran cuantificados con puntuación para evaluar la incidencia de infecciones del tracto respiratorio superior. Fue hecha la soma de episodios de infecciones del tracto respiratorio superior del período de estudio de cada individuo en cada grupo (PC, PA, S). La incidencia de infecciones del tracto respiratorio superior no fue diferente significativamente entre los grupos. Se concluye que la incidencia de infecciones del tracto respiratorio superior no tiene relación con el ambiente de la piscina en que se nada (cubierta o no) y con la práctica de natación de intensidad moderada para esta época del año en la cuidad de Belo Horizonte. **Palabras-clave:** Natación, Infecciones de las Vías aéreas superiores, Sedentarios.

ANÁLISE DA INCIDÊNCIA DE INFECÇÕES NAS VIAS AÉREAS SUPERIORES EM ALUNOS QUE PRATICAM NATAÇÃO EM PISCINA COM E SEM COBERTURA E SEDENTÁRIOS

RESUMO

O objetivo principal do presente estudo foi verificar se há associação entre a incidência de infecções do trato respiratório superior (URTI), a prática de natação em piscina coberta, descoberta e o sedentarismo. Participaram cento e vinte indivíduos voluntários de ambos os sexos, sendo quarenta praticantes regulares de natação em piscina coberta, quarenta praticantes regulares em piscina descoberta e quarenta sedentários. Para a coleta dos dados foi utilizado o Formulário de Registro de Doença Mensal de Gleeson et al. (2000), onde os indivíduos relatam seus sinais e sintomas de infecções por um período de trinta e um dias, classificando-os entre ameno, moderado e severo. Os dados coletados foram quantificados com pontuação para avaliar a incidência de infecções do trato respiratório superior. A contagem de episódios de URTI foi realizada para cada indivíduo de cada grupo. A incidência de infecções do trato respiratório superior foi analisada por meio do teste Qui-quadrado, com o p 0,05. A URTI não foi significativamente diferente entre os grupos. Conclui-se que a incidência de infecções do trato respiratório superior não tem relação com o ambiente onde é realizada a atividade (piscina coberta ou descoberta) e com a prática de natação de intensidade moderada nos meses de março e abril, nas regiões Oeste e Pampulha na cidade de Belo Horizonte, Minas Gerais.

Palavras-chave: Natação, Infecções das Vias aéreas superiores, Sedentários.