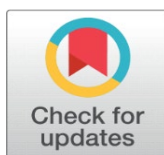


EFFECT OF ULTRA-ENDURANCE PHYSICAL ACTIVITY ON THE RESPIRATORY HEALTH OF THE WOMEN RUNNERS

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ABSTRACT

Background: Endurance physical activities like running are beneficial for enhancement in immunity and functional health. But excessive and high intensity sustained endurance physical activities like marathon and ultra-marathon running might negatively affect the immune capacity of the participants at least temporarily due to high inflammatory stress. Compromises in upper respiratory tract health may be common among recreational marathon runners. **Methods:** Thirty women recreational marathon runners above the age of forty years participated in the study. WURSS-44 questionnaire was used to quantify the URTI symptom scores of the participants on the previous day of the run, followed by after one day, three days, five days, seven and nine days. ANOVA was used to find out the variance among the different days at 0.05 level of significance. **Results:** Variance analysis indicated that there was significant difference among the different days URTI scores ($F=3.2441$ at P of 0.0079) of the group and the Tukey's HSD post hoc analysis brings out that there was significant difference between the run previous day score and the after seventh day score (4.78 at P of $p<0.05$) and also significant difference between the post first day score and the post ninth day score (4.349 at P of $p<0.05$) for the group. **Conclusion:** Above forty years women recreational runners' group of the study experienced significant increments in their URTI symptoms score due to their acute marathon running event.

Keywords: Marathon Running, Inflammatory Stress, Recreational Runners, Respiratory Tract Infection

1. INTRODUCTION

Exercise seems beneficial for the functional health and there are several forms of exercises which produce different effects on the individuals in terms of their functional physiological health [Fierens and Goossens \(2020\)](#). Sports sciences researchers are indicating that individuals need several forms of exercises to keep the functional health of all the systems of the body so that the overall health can be maintained. Different physical fitness factors are linked to different exercise forms

and these fitness factors are responsible for the functional health of the individuals. But the health benefits of exercises are not considered much in the elite sporting field and the elite athletes are taking risk of exposing themselves to very high intensity trainings which may impair their immunity and health. While the elite sportspersons are exposing themselves for health risks for the sake of sports achievements [Mrakic-Sposta et al. \(2015\)](#), [Nieman et al. \(2006\)](#) there is other lot of exercising individuals who might be taking risk similarly. The modern trend in exercise scenario seems the marathon running and cycling. Hundreds and thousands of individuals who are not physically active earlier in their lives are participating in marathon running events without proper foundation training and consolidation of their physiology for such sustained aerobic activities. Proper training and foundation are highly essential for participation in ultra-endurance physical activities like marathon running and ultra-cycling including proper nutritional strategies [Devrim-Lanpir et al. \(2020\)](#). The chances of experiencing suppressed immunity and infections among these runners may be high as they are not properly trained for such endurance activities [Ihalainen et al. \(2016\)](#). High amounts of inflammatory and oxidative stress [Graille et al. \(2020\)](#) due to the ultra-endurance physical activities may severely affect the respiratory tract health thereby causing respiratory tract infections among the ultra-endurance athletes [He et al. \(2014\)](#). Recreational running has become a big passion among the urban elite and the women recreational runners are also participating in such events in large numbers. It is important to consider the health of these women recreational runners [Rodriguez and Silveyra \(2020\)](#). Qualitative assessment of the respiratory distress due to the ultra-activities are systematically studied in sports sciences [Price et al. \(2016\)](#). Upper Respiratory Tract Infection symptoms were measured among the above 40 years old women marathon runners for analysis.

2. METHODOLOGY

Thirty women recreational runners who are above the age of forty years and who participated in the Hyderabad Airtel Marathon event were included. The women runners were clearly explained about the importance of the study and also requested to spare enough time to fill the questionnaire of the study. The criterion variable for the study was Upper Respiratory Tract Infection symptom scores. This URTI symptoms score was measured through the responses given by the women recreational runners of the study [Anderson and Kippelen \(2012\)](#). The questionnaire used for the study was most credible and extensively used one, which is called as WURSS-44 (Wisconsin Upper Respiratory Symptom Survey-44) which is also the full version of the questionnaire. The questionnaire measures the thirty-two symptoms of the URTI with eight different options for the scoring. The women runners responded one day prior to their running event, and then for five times after the event, twenty-four hours after the event, after third day, after fifth day, after seventh day and finally after the ninth day. The scores of the thirty women runners were consolidated and analysed with the help of Analysis of Variance (ANOVA) and further with the Tukey's HSD post hoc test. Level of significance used for the study was 0.05.

3. ANALYSIS OF DATA

One way ANOVA was applied to find out whether there was any significant difference for the URTI symptom scores of the different days of the recreational marathon runners. The descriptive statistics of the mean comparison indicated that the average URTI symptom scores of the age group varied significantly from the pre-

race average to the post run days averages of the URTI symptom scores. Pre run URTI average of the women groups was 48.7 and the same got increased to

Figure 1

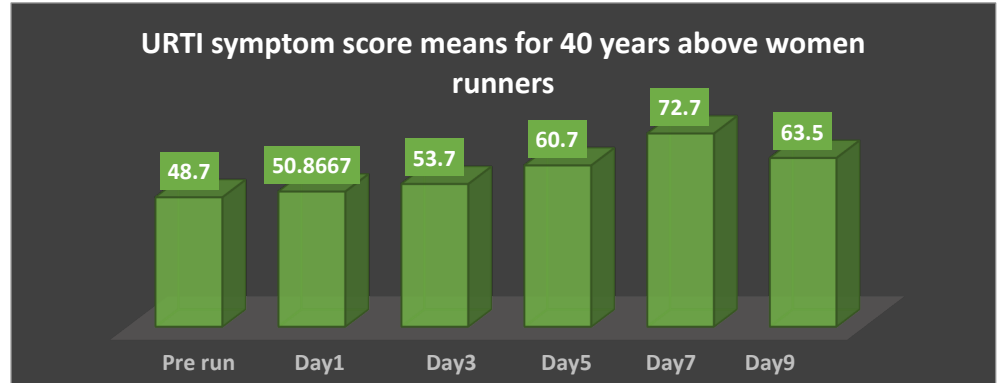


Figure 1

50.86 and further increased to 53.7 after three days, to 60.7 after five days, and to 72.7 after seven days. After nine days the URTI average started decreasing and after nine days the URTI average was 63.5.

Table 1

Table 1 ANOVA for URTI Symptom Scores of Above 40 Years Women Recreational Running Group

Source	SS	df	MS	F	P
adjusted means	12,261.3611	5	2,452.272	3.2441	0.0079
adjusted error	131,528.1667	174	755.9090		
adjusted total	143,789.5278	179			

The analysis of variance in table I indicated that there was significant difference exists among the various URTI averages of the women recreational running group as the obtained F was 3.2441 and the P value being 0.0079. Hence, the Tukey HSD post hoc test was conducted to find out the source of the significant difference and to analyse the URTI differences among the various days after the marathon running event when compared to the pre run event URTI scores and among the various days URTI averages of the group. Table II indicated the results of the Tukey’s HSD post hoc test. The table clearly indicated that there was significant difference between the URTI score of the pre run and the seventh day after the marathon event URTI score, and also there was significant difference between the URTI score of the first day after the marathon event and the ninth day after the marathon event. The table

Table 2

Table 2 Tukey HSD Post Hoc Comparison Test (Q critical for K=6, V=174 at 0.05 level = 4.0754)

Treatments pair	Tukey HSD Q statistic	Tukey HSD2 p-value	Tukey HSD3 inference
A vs B	0.4316	0.8999947	insignificant
A vs C	0.9961	0.8999947	insignificant

A vs D	2.3906	0.5343363	insignificant
A vs E	4.7812	0.0113326	* p<0.05
A vs F	2.9484	0.3001356	insignificant
B vs C	0.5644	0.8999947	insignificant
B vs D	1.959	0.7090886	insignificant
B vs E	4.3496	0.0289634	* p<0.05
B vs F	2.5168	0.4822202	insignificant
C vs D	1.3945	0.8999947	insignificant
C vs E	3.7851	0.0854666	insignificant
C vs F	1.9523	0.711778	insignificant
D vs E	2.3906	0.5343363	insignificant
D vs F	0.5578	0.8999947	insignificant
E vs F	1.8328	0.7601699	insignificant

indicated that there was no significant difference between any other two URTI scores of the women recreational runners' group.

4. DISCUSSION ON RESULTS

The results indicated that the above 40 years women recreational running group of the study experienced significant increments in their URTI episodes due to their participation in the acute marathon running event at least after seven days, but their URTI scores increased linearly every day till the end of the seventh day and only to reduce to some extent after the ninth day. This indicated that the exposure to the acute marathon running could have induced inflammatory stress [Barros et al. \(2017\)](#) that might have resulted in temporary suppression in their respiratory tract immunity causing the increased URTI episodes [Cantó et al. \(2018\)](#). Increase in their URTI episodes was noticed continuously for nine days and especially the increments in URTI episodes were significantly high after the seventh day and after the ninth day.

5. CONCLUSIONS

The above forty years women recreational group of the study experienced increases in their URTI symptoms after their acute marathon running event participation significantly for seven continuous days, indicating respiratory tract inflammatory stress and the consequent temporary immune suppression of the upper respiratory tract specially. The women recreational runners of the older age need to be more cautious in terms of their preparation for the marathon events and participation. They may need additional support like nutritional supplements or other recovery processes during their training and competition.

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