Section A-Research paper
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A study on the Nutritional Knowledge among the Inter University Women Players of different disciplines

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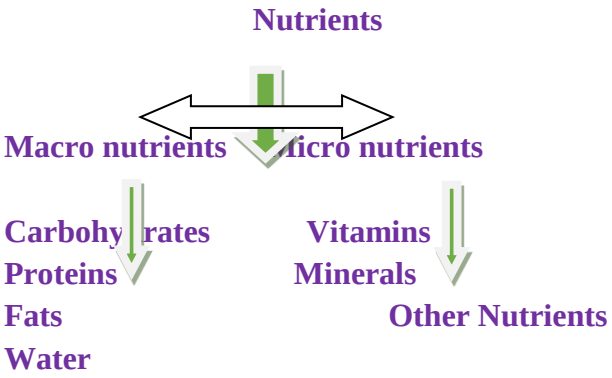
INTRODUCTION

The precincts of Physical education envisages for healthy body through physical means. Sport is integral part of physical education to achieve the excellence of human endeavor in every field and it is possible too. Knowledge is the source of leaning process and knowledge grows along the paths of learning and maturity of human being is possible through the obeisance to the scientific concepts of different subject areas like sociology, psychology, nutrition, physics etc. Science of nutrition is an essential knowledge for everyone and especially for women. Women because of their special physiological demands are at a different spectrum with respect to nutritional requirements.



Some of the nutrients we consume act as metabolic initiators and some other nutrients would help in anti oxidative activities directly and protect the body from oxidative stress. Hence, different nutrients we consume through food have different roles to assume and all are important and all these nutrients to be consumed in different proportions as per the requirement and as indicated by the health agencies.

Excellence in sports or achieving higher order performances require several factors like genetic endowment, proper nurture and training, excellent nutrition etc. Nutrition plays vital part in the sporting excellence both men and women, where as women need to be more cautious with respect to sports nutrition as the sporting woman physiology requires nutrition which is highly balanced.

It is the knowledge that makes a person to perceive differently and to act in a judicious manner. Hence, knowledge of nutrition is highly essential for sportspersons to make them ready for the sporting activity and also to be able to face the physiological challenges of the high intensity physical training protocols. Though the specialists like sports nutritionists

need to take care of the diet program of the sportspersons, it would be ideal if the sportspersons is endowed with an optimal knowledge of sports nutrition knowledge.

Statement of the problem:

The purpose of this study was to make a survey on nutrition knowledge of inter university women players.

Variables for the study:

There criterion variable for the study are Knowledge on Nutrition (with four dimensions: Knowledge for general nutrition, Knowledge on nutrition for general health, Knowledge on nutrition for fitness and Knowledge on nutrition for Sports Performance)

Hypotheses:

At the initiation of the study, the following hypotheses were formulated and the same would be tested with the results obtained through the statistical analysis.

1. The four groups of inter university women players of the study may not have adequate nutrition knowledge.

2. There may not be any significant difference on nutrition knowledge among the four age groups of women players of the study.

Delimitations of the study: The research was conducted with the following delimitations:

1. Women players of the inter university level only.
2. Age between 18 and 21 years.
3. Eight hundred and twenty women players were surveyed.

Limitations of the study:

1. No discrimination in the status of women like high socio economic status etc.
2. The initial questionnaires were done by the volunteer women only with the guidance provided by the researcher.

Inclusion criteria:

1. Only who are psychologically healthy at the time of commencement of the study were only included into the study.
2. Those who could clearly understand research criteria and also the questionnaires were only included.

Exclusion Criteria:

1. Highly elite sports persons like national and international levels players were not included for this study to make study a normally plotted one.

Significance of the study:

1. The results of the study will provide an understanding on the Knowledge on nutrition among the Inter university level women players.
2. The results would also bring out a clear information on the Knowledge on nutrition for general health, for fitness and for sports performance among the inter university level women players.
3. The results would pave way to understand the present scenario of nutritional knowledge on nutrition and would provide guidance for trainers, coaches and sports nutritionists ways and means to improve the nutritional knowledge among the inter university level women players.
4. The results of the study would aid as a measure and to scheme the nutrition workshops for inter university women players.

Methodology: *Q*uestionnaire to know the Nutrition knowledge of the players of the study with four dimensions, Awareness on Nutrition, Nutrition knowledge for general health, Nutrition knowledge for fitness and Nutrition knowledge for sports Performance was prepared. The investigator with the help of nutrition experts and other related experts in the field of sports nutrition etc, had developed appropriate statements to be included into the questionnaires. After the Cronbach's alpha reliability testing the questionnaire consists of twenty five statements accommodating four dimensions.

Four dimensions of Knowledge on Nutrition questionnaire

Dimension	Total No of Statements	Statements Numbered
Awareness on Nutrition	6	8, 18, 20, 22, 23, 25
Nutrition for General Health	4	3, 5, 10, 16
Nutrition for Fitness	7	1, 4, 6, 9, 17, 21, 24
Nutrition for Performance	8	2, 7, 11,12, 13, 14, 15, 19

Likert's scale was used to quantify the responses of the players of the study. There were four age group players in this study, 18 years, 19 years, 20 years and 21 years. Eight hundred and twenty Inter university level women players responded for this study though all the groups did not have equal subjects. After quantification of the responses of the four groups, Analysis of Variance (ANOVA) was used to know whether the four groups showed any significant difference in all the four dimensions of the study or not. Bonferroni and Holm's Post hoc pair's comparison test was used to find out which group showed significant difference when compared to other groups of the study.

Analysis on results: Questionnaire for knowing Knowledge on nutrition with four dimensions, Awareness on nutrition, Awareness on nutrition for general health, awareness on nutrition for fitness and awareness on nutrition for performance were prepared

Analysis on the dimension of awareness on nutrition: Analysis of variance as depicted in table I clearly indicates that the P value ie 4.9449e-13 (0.000049) for the corresponding F value of the table is less than the desired 0.05 and hence this clearly suggests that one or many of the four groups of the study differ significantly in their awareness on nutrition dimension.

Table I. Analysis of Variance for Awareness on nutrition

source	sum of squares SS	degrees of freedom vv	mean square MS	F statistic	p-value
treatment	**706.0134**	**3**	**235.3378**	**20.8667**	**4.9449e-13**
error	**9,202.9854**	**816**	**11.2782**		
total	**9,908.9988**	**819**			

To find out the pairs of the groups of the study which are significantly different from each other to know the source of significant difference among the

Table II. Bonferroni and Holm post hoc pair's comparison test

treatments pair	Bonferroni and Holm TT-statistic	Bonferroni p-value	Bonferroni inference	Holm p-value	Holm inference
A vs B	1.2339	1.3054937	insignificant	0.2175823	insignificant
A vs C	4.2807	0.0001250	** p<0.01	8.3363e-05	** p<0.01
A vs D	7.2454	5.9992e-12	** p<0.01	5.9992e-12	** p<0.01
B vs C	3.0281	0.0152285	* p<0.05	0.0076142	** p<0.01
B vs D	5.9778	2.0276e-08	** p<0.01	1.6897e-08	** p<0.01
C vs D	2.9547	0.0193157	* p<0.05	0.0064386	** p<0.01

groups on the awareness on nutrition Bonferroni and Holm multiple comparison post hoc tests was conducted. The same is depicted in table II. In this comparison 18 years, 19 years, 20 years and 21 years women player groups were identified as A, B, C and D respectively. The comparison was done accordingly. In column II of the table the Bonferroni and Holm Tt-statistic is shown for comparison to Bonferroni P-value and Holm P-value for comparison and for identify whether the difference between the compared two groups is significant or not. The table clearly indicates that there is no significant difference between 18 years and 19 years group of the study in their awareness on nutrition dimension, where as all the other between the groups comparison indicates that the all the other comparisons showed significant difference among themselves indicating that 20 years, 21 years groups of the study are significantly different when compared to the 18 years group of the study, 20 years and 21 years groups of the study are significantly different when compared to the 19 years group of the study and 20 years group of the study shows significant difference when compared to the 21 years group of the study. The above finding through the Bonferroni and Holm post hoc comparison indicates that 19 years, 20 years and 21 years age groups of the study are significantly different among themselves in the awareness of nutrition dimension of the study.

Awareness on nutrition for general health : Analysis of variance as depicted in table III clearly indicates that the P value ie 1.1102e-13 (0.00011) for the corresponding F value of the table is less than the desired 0.05 and hence this clearly suggests that one or many of the four groups of the study differ significantly in their awareness on nutrition for general health dimension.

Table III. Analysis of variance on awareness on nutrition for general health

source	sum of squares SS	degrees of freedom νν	mean square MS	F statistic	p-value
treatment	483.4471	3	161.1490	31.7392	1.1102e-16

error	**4,143.0639**	**816**	**5.0773**
total	**4,626.5110**	**819**	

Table IV. Bonferroni and Holm post hoc pair's comparison test

treatments pair	Bonferroni and Holm TT-statistic	Bonferroni p-value	Bonferroni inference	Holm p-value	Holm inference
A vs B	**4.8570**	**8.5708e-06**	**** p<0.01**	**5.7139e-06**	**** p<0.01**
A vs C	**6.1199**	**8.7186e-09**	**** p<0.01**	**7.2655e-09**	**** p<0.01**
A vs D	**9.5796**	**0.0000e+00**	**** p<0.01**	**0.0000e+00**	**** p<0.01**
B vs C	**1.3090**	**1.1453592**	**insignificant**	**0.1908932**	**Insignificant**
B vs D	**4.7957**	**1.1562e-05**	**** p<0.01**	**5.7809e-06**	**** p<0.01**
C vs D	**3.4631**	**0.0033712**	**** p<0.01**	**0.0011237**	**** p<0.01**

To find out the pairs of the groups of the study which are significantly different from each other to know the source of significant difference among the groups on the awareness on nutrition for general health, Bonferroni and Holm multiple comparison post hoc tests were conducted. The same is depicted in table VI. In this comparison 18 years, 19 years, 20 years and 21 years women player groups were identified as A, B, C and D respectively. The comparison was done accordingly. In column II of the table the Bonferroni and Holm Tt-statistic is shown for comparison to Bonferroni P-value and Holm P-value for comparison and for identify whether the difference between the compared two groups is significant or not. The table clearly indicates that there is no significant difference between 19 years and 20 years groups of the study in their awareness on nutrition for general health dimension, where as all the other between the groups comparison indicates that the all the other comparisons showed significant difference among themselves indicating that 19 years, 20 years and 21 years groups of the study are significantly different when compared to the 18 years group of the study. 21 years group of the study was significantly different when compared to both the 19 years group of the study and 20 years group of the study. The above finding through the Bonferroni and Holm post hoc comparison indicates that except the insignificant difference between 19 years and 20 years groups of the study, all other groups significantly differ in their knowledge on nutrition for general health.

Awareness on nutrition for fitness : Analysis of variance as depicted in table V clearly indicates that the P value ie 1.1102e-16 (0.00011) for the corresponding F value of the table is less than the desired 0.05 and hence this clearly suggests that one or many of the four groups of the study differ significantly in their awareness on nutrition for fitness dimension.

Table V. Analysis of Variance for awareness on nutrition for fitness

source	sum of squares SS	degrees of freedom νν	mean square MS	F statistic	p-value
treatment	978.3313	3	326.1104	31.9217	1.1102e-16
error	8,336.2248	816	10.2160		
total	9,314.5561	819			

To find out the pairs of the groups of the study which are significantly different from each other to know the source of significant difference among the groups on the awareness on nutrition for fitness, Bonferroni and Holm multiple comparison post hoc tests were conducted. The same is depicted in table VI. In this comparison 18 years, 19 years, 20 years and 21 years women player groups were identified as A, B, C and D respectively. The comparison was done accordingly. In column II of the table the Bonferroni and Holm Tt-statistic is shown for comparison to Bonferroni P-value and Holm P-value for comparison and for identify whether the difference between the compared two groups is significant or not. The table clearly indicates that there is no significant difference between 19 years and 20 years groups, and also there is no significant difference between 20 years and 21 years groups of the study in their awareness on nutrition for fitness dimension, where as all the other between the groups comparison indicates that the all the other comparisons showed significant difference among themselves indicating that there

Table VI. Bonferroni and Holm post hoc pairs comparison test

treatments pair	Bonferroni and Holm TT-statistic	Bonferroni p-value	Bonferroni inference	Holm p-value	Holm inference
A vs B	6.2200	4.7617e-09	** p<0.01	3.1745e-09	** p<0.01
A vs C	7.3100	3.8263e-12	** p<0.01	3.1886e-12	** p<0.01
A vs D	9.1000	0.0000e+00	** p<0.01	0.0000e+00	** p<0.01
B vs C	1.1551	1.4904368	insignificant	0.2484061	Insignificant
B vs D	3.0081	0.0162593	* p<0.05	0.0081296	** p<0.01
C vs D	1.8465	0.3911070	insignificant	0.1303690	Insignificant

was significant difference between 18 and 19 years groups, 18 and 20 years groups and 18 and 21 years groups of the study. Also, there is significant difference between 19 and 21 years groups of the study. The above finding through the Bonferroni and Holm post hoc comparison indicates that except the insignificant difference between 19 years and 20 years groups and also 20 and 21 years groups of the study, all other groups significantly differ in their knowledge on nutrition for fitness.

Awareness on nutrition for performance: Analysis of variance as depicted in table VII clearly indicates that the P value ie 1.1102e-16 (0.00011) for the corresponding F value of the table is less than the desired 0.05 and hence this clearly suggests that one or many of the four groups of the study differ significantly in their awareness on nutrition for fitness dimension.

Table VII. Analysis of Variance for Awareness on nutrition for performance

source	sum of squares SS	degrees of freedom vv	mean square MS	F statistic	p-value
treatment	1,270.8346	3	423.6115	32.3608	1.1102e-16
error	10,681.6666	816	13.0903		
total	11,952.5012	819			

To find out the pairs of the groups of the study which are significantly different from each other to know the source of significant difference among the groups on the awareness on nutrition for performance, Bonferroni and Holm multiple comparison post hoc tests were conducted. The same is depicted in table VIII. In this comparison 18 years, 19 years, 20 years and 21 years women player groups were identified as A, B, C and D respectively. The comparison was done accordingly. In column II of the table the Bonferroni and Holm Tt-statistic is shown for comparison to Bonferroni P-value and Holm P-value for comparison and for identify whether the difference between the compared two groups is significant or not. The table clearly indicates that there is no significant difference between 20 years and 21 years groups of the study in their awareness on nutrition for performance dimension, where as all the other between the groups comparison indicates that the all the other comparisons showed significant difference among themselves indicating that there is significant difference between 18 and 19 years groups, 18 and 20 years groups and 18 and 21 years groups of the study. Also, there is significant difference between 19 and 20 years groups and 19 and 21 years groups of the study.

Table VIII. Bonferroni and Holm post hoc pairs comparison test

treatments pair	Bonferroni and Holm TT-statistic	Bonferroni p-value	Bonferroni inference	Holm p-value	Holm inference
A vs B	3.2903	0.0062621	** p<0.01	0.0020874	** p<0.01
A vs C	7.6433	3.5705e-13	** p<0.01	2.9754e-13	** p<0.01
A vs D	8.6447	0.0000e+00	** p<0.01	0.0000e+00	** p<0.01
B vs C	4.3453	9.3964e-05	** p<0.01	4.6982e-05	** p<0.01
B vs D	5.3805	5.8273e-07	** p<0.01	3.8849e-07	** p<0.01
C vs D	1.0798	1.6832621	insignificant	0.2805437	Insignificant

The above finding through the Bonferroni and Holm post hoc comparison indicates that except the insignificant difference between 20 years and 21 years groups of the study, all other groups significantly differ in their knowledge on nutrition for performance.

Conclusions from the study:

The following conclusions are given from the results obtained in the study and keeping in view of the limitations and delimitations of the study conducted.

1. It was concluded that all the four groups of the study 18 years, 19 years, 20 years and 21 years groups, showed significant knowledge on the Nutrition.
2. Also it was concluded that all the four groups showed significant awareness on nutrition, nutrition for general health, nutrition for fitness and nutrition for performance.
3. It was concluded that there was significant difference between 18 yrs and 20 yrs, 18 yrs and 21 yrs, 19 yrs and 20 yrs, 19 yrs and 21 yrs and 20 yrs and 21 yrs groups of the study with respect to the awareness on nutrition dimension.
4. It was concluded that there was no significant difference between 18 yrs and 19 yrs groups with respect to the awareness on nutrition dimension.
5. It was concluded that there was significant difference between 18 yrs and 19 yrs, 18 yrs and 20 yrs, 18 yrs and 21 yrs, 19 yrs and 21 yrs and 20 yrs and 21 yrs groups of the study with respect to the awareness on nutrition for general health dimension.
6. It was concluded that there was no significant difference between 19 yrs and 20 yrs groups with respect to the awareness on nutrition for general health dimension.
7. It was concluded that there was significant difference between 18 yrs and 19 yrs, 18 yrs and 20 yrs, 18 yrs and 21 yrs, and 19 yrs and 21 yrs groups of the study with respect to the awareness on nutrition for fitness dimension.
8. It was concluded that there was no significant difference between 19 yrs and 20 yrs and 20 yrs and 21 yrs groups of the study with respect to the awareness on nutrition for fitness dimension.
9. It was concluded that there was significant difference between 18 yrs and 19 yrs, 18 yrs and 20 yrs, 18 yrs and 21 yrs, 19 yrs and 20 yrs and 19 yrs and 21 yrs groups of the study with respect to the awareness on nutrition for performance dimension.
10. It was concluded that there was no significant difference between 20 yrs and 21 yrs groups with respect to the awareness on nutrition for performance dimension.

DISCUSSION ON RESULT

At the initiation of the study, the following hypotheses were formulated and the same would be tested with the results obtained through the statistical analysis. The following discussion has been drawn.

1. The four groups of inter university women players of the study may not have adequate nutrition knowledge is regected. All the four groups of the study had clearly indicated through their responses that they had significant knowledge on all the four dimensions of the knowledge on nutrition, viz Knowledge on general nutrition dimension, knowledge on nutrition for general health, knowledge on nutrition for fitness and knowledge on nutrition for performance.
2. The hypothesis that there may not be any significant difference on nutrition knowledge among the four age group of women players of the study was accepted with respect to the 18 years and 19 years women player groups of the study with respect to the

Knowledge on general nutrition dimension, 19 years and 20 years groups of the study With respect to the Knowledge on nutrition for general health dimension, 19 years and 20 years groups and also between 20 and 21 years groups of the study With respect to the knowledge on nutrition for fitness, and 20 and 21 years groups of the study With respect to the Knowledge on nutrition for performance. Whereas, the hypothesis that there may not be any significant difference on nutrition knowledge among the four age group of women players of the study was rejected, as there was no significant difference for 18 yrs and 20 yrs groups, 18 yrs and 21 yrs groups, 19 yrs and 20 yrs groups, 19 yrs and 21 yrs groups and 20 and 21 yrs groups of the study on the knowledge on general nutrition dimension, for 18 yrs and 19 yrs groups, 18 yrs and 20 yrs groups, 18 yrs and 21 yrs groups, 19 yrs and 21 yrs groups and 20 yrs and 21 yrs groups of the study for knowledge on nutrition for general health dimension, for 18 yrs and 19 yrs groups, 18 yrs and 20 yrs groups, 18 yrs and 21 yrs groups and 19 21 yrs groups of the study for the knowledge on the nutrition for fitness dimension and for 18 and 19 yrs groups, 18 and 20 yrs groups, 18 and 21 yrs groups, 19 and 20 yrs groups and 20 and 21 yrs groups of the study for the knowledge on the nutrition for performance dimension.

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