

Relationship of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players

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Abstract

The purpose of this study was to investigate the Relationship of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players. Subjects for the study were selected from Banaras Hindu University and Mahatma Gandhi Kashi Vidyapeeth Varanasi. Total of 20 students were selected purposively. Age of the Subjects was ranged from 17 to 25 years. Digit Ratio (2D:4D) was measured with the help of digital caliper and Nutritional Assessment were measured by Life Style Assessment Inventory by Anspangh Davids, Michael, H. Hamrich and Frank D. Rosato. Digit Ratio (2D:4D) was considered as Independent variables and Nutritional Assessment was considered as dependent variables. To find out the Relationship of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players, using Pearson's linear correlation was used. The level of significance was set at 0.05. There was positive relationship between Right hand ratio and nutritional assessment score. There was no significant relationship between left hand ratio and nutritional assessment score.

KEYWORD: Digit Ratio, Nutritional Assessment, Life Style

Introduction

The term **Life style** is rather a defused concept often used to denote **the way people live** reflecting of a whole range of social values, attitudes and activities. It is composed of cultural and behavioral patterns and lifelong personal habit, (example, smoking, alcoholism) that have developed through processes of socialization. In other words **Life style** is a term to describe the way a person lives, which was originally coined by Austrian psychologist Alfred Adler in 1929.

Life style factors such as personality traits, living habits, nutrition, physical exercise, use of alcohol, drugs and smoking, behavioural pattern etc., play major role in determining the outcome of an individual's exposure to infection. Health requires the promotion of healthy Life style. In the last twenty years a considerable cumulated data indicates that there is an association between health and Life style of individual. Many current day health problems especially in the developed countries are associated with Life style changes. In developing countries, such as India, where traditional Life style still persist risks of illness and death, with lack of sanitation, poor nutrition, personal hygiene, elementary human habits, customs and cultural patterns .

The ratio of the length of the second to fourth digit (2D:4D ratio) presumably reflects prenatal exposure to sex hormones. The 2D:4D ratio is sexually dimorphic, and males consistently have a slightly lower value (Manning et al. 1998). This dimorphism appears to emerge during early development, is consistent across different age classes and reflects foetal testosterone and oestrogen levels (Lutchmaya et al. 2004). 2D:4D ratios appear to correlate with a variety of covariates related to sex-dependent behavior (Manning & Fink 2008). Although results are not always

homogeneous, there are indications that 2D:4D ratios correlate with aggression, dominance, sporting ability, fertility problems, number of children, health status, sexual orientation and other variables related to reproductive success. These associations appear to be often stronger for the right hand 2D:4D (see Putz et al. 2004 and Manning & Fink 2008 for recent overviews). Putz et al. (2004) questioned the general usefulness of 2D:4D ratios that Manning and Fink (2008) accept, and argued that because levels of sex hormones fluctuate during growth and development, various sexually dimorphic traits differentiate at different ages, which obscures associations between 2D:4D ratios and traits affected by sex hormones.

Nutritional Wellness is important aspect of health. There is a lot needs to be learnt by Indians in terms of good nutritional practices and cooking methods. Traditional habitué's have to be partially modified to adapt to modern scientific knowledge. All the resources available from nature and the benefits of technology are enjoyable only when we have good health. In a broad sense, the health of Indians has improved tremendously over the past six decades. In the 1940s the average life expectancy of an Indian was about thirty years; it is now about sixty six years. That fact that we now have about 110 million senior citizens (above sixty years of age) speaks volumes about the overall health situation improved through good nutrition. Most of us think Health care is only relevant when we become ill; there is no concept of prevention. In fact, many diseases can be prevented if our personal hygiene is taken care of and our local environment is kept clean, free of garbage and stagnant pools of water. Similarly many of us do not take care of the cleanliness of the food we eat. Many meat and fish products are not stored properly. Better hygiene can come partly from general facilities made available by public authorities (including clean public toilets) and partly from our own learning and awareness as well as civic sense.¹

This paper reports results of a study that examines the relationship between 2D:4D ratio, Nutritional Assessment of University Basketball Players in young adults between 17 to 25 years old. This age group is of particular interest because the 2D:4D ratio appears to reach the highest value at age 17 in the study by McIntyre et al. (2005). Furthermore, because sexual dimorphism in 2D:4D is often stronger for the right hand (Manning 2002), I compare patterns between the sides. If 2D:4D ratios are a biologically meaningful proxy of foetal hormone exposure, presumed associations with adult hormones and its possible effects on pubertal and adult development and behavior, it can be predicted that 2D:4D (i) is lower in males; (ii) remains sexually dimorphic in different age groups; (iii) is positively correlated with the body mass index (BMI) (because high BMI levels reflect low testosterone levels, Fink et al. 2003). Furthermore, we can expect that high androgen (low 2D:4D ratio) in males and high oestrogen (high 2D:4D ratio) in females respectively relate to high mating success.

Significance, Objective and Hypothesis

Significance of the Study: (1) the study may be useful to improve the life style standard of the individuals. (2) The study may help university basketball players for self assessment. **Objective:** The objective of the study was to find out the Relationship of Digit Ratio (2D:4D) and Nutritional Assessment of basketball players. **Hypothesis:** It was hypothesized that there shall not be any significant Relationship of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players.

¹ A.P.J. Abdul Kalam & Y.S. Rajan (2010). The scientific Indian – A twenty- first century guide to the world around us. New Delhi: Penguin Books India Pvt. Ltd.

Methodology

Subjects: Subjects for the study were selected from Banaras Hindu University and Mahatma Gandhi Kashi Vidyapeeth Varanasi. Total of 20 students were selected. Age of the Subjects was ranged from 17 to 25 years. **Variables / Contents selected:** Digit Ratio (2D:4D) was considered as Independent variables and Nutritional Assessment was considered as dependent variables. **Questionnaire used:** Life Style Assessment Inventory by Anspangh Davids, Michael, H. Hamrich and Frank D. Rosato was adopted to collect data for Life Style Assessment. Validity of the questionnaire in Indian Conditions was found .89.

Digit ratios

Photocopies of the two hands were made for later calculation of the 2D:4D ratio. Second copies were made if the landmarks used for measuring were lacking in quality. Despite this, digit ratios could not be measured in five players because landmarks could not be clearly identified. The lower landmark was the most basal crease on each finger and the upper landmark was the most distal point on the finger tip. Distance between the landmarks was measured twice with a ruler to the nearest 0.5 mm. The digit ratio was calculated for each hand by dividing the length of the second by that of the fourth digit. The inter rater reliability between two blind raters was calculated. Reliabilities for the digit ratios (intra-class correlation coefficients) were: right hand $r_1 = .94$; left hand $r_1 = .92$. All ratios reported are the average of the two independent raters.

Statistical Analysis: To find out the Relationship of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players, were analyzed using descriptive analysis and Pearson's linear correlation was used. Analysis was performed using SPSS 16.0 (SPSS Inc., Chicago, IL, USA), and differences were considered statistically significant when P values were less than 0.05.

Analysis of Data

Descriptive Statistics of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players

	Age of the subject	Height	Weight	Left hand ratio	Right hand ratio	Nutritional Assessment score
Mean	21.70	1.827	73.550	1.004	.9921	63.45
SEM	.6074	1.303	2.070	.0123	.01399	2.915
S.D.	2.716	5.829	9.259	.0552	.0625	13.036
Variance	7.379	33.98	85.734	.003	.004	169.945
Skewness	1.000	1.305	.131	-.401	.234	-.264
SES	.512	.512	.512	.512	.512	.512
Kurtosis	.294	2.745	-.169	.595	-.518	.834
SEK	.992	.992	.992	.992	.992	.992
Range	10.00	25.00	34.00	.23	.22	56.00
Minimum	18.00	175.00	58.00	.89	.89	32.00

Maximum	28.00	200.00	92.00	1.12	1.12	88.00
Sum	434.00	3655.00	1471.0	20.08	19.84	1269.00

The descriptive statistics of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players is presented in Table-1

The mean, standard deviation and range of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players were as follows: Age of the subject (21.70 ± 2.716), range of age was 10.00, Height (1.827 ± 5.829), range of height was 25.00, Weight (73.550 ± 9.259), range of Weight was 34.00, Left hand ratio ($1.004 \pm .0552$), range of Left hand ratio was .23, Right hand ratio $.9921 \pm .0625$), range of Right hand ratio was .22, Nutritional Assessment score (63.45 ± 13.036), range of Nutritional Assessment score was 56,

The minimum & maximum value of Age & Height were 18.00 to 28.00 & 175.00 to 200.00 respectively, Left hand ratio & right hand ratio were .89 to 1.12 & .89 to 1.12 Weight & Nutritional Assessment score were 58.00 to 92.00 & 32 to 88 respectively, of University Basketball Player.

Fig-1 Graphical Representation of Selected Descriptive Statistics Relationship of Digit Ratio (2D:4D) and Nutritional Assessment of University Basketball Players

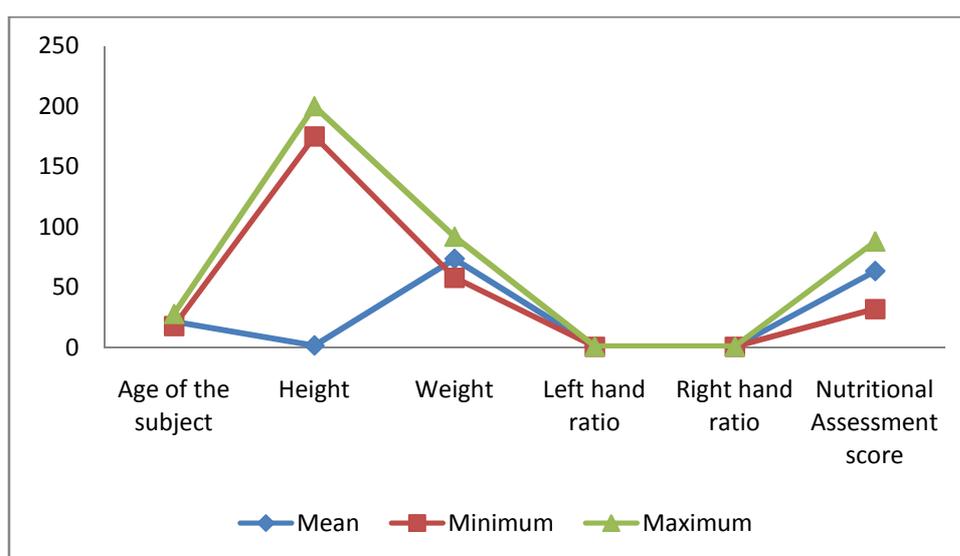


Table -2
Correlation between dependent variable Nutritional Assessment and Independent Variables Digit Ratio (2D:4D)

Variables correlated	Co-efficient of correlation
Right hand ratio and nutritional assessment score	.480*
Left hand ratio and nutritional assessment score	.142

*Significance at 0.05 level,

r.05 20,2 (18), 0.444

An analysis of table-2 reveals that right hand ratio (2D:4D) is significantly correlated to nutritional assessment score as the obtained co-efficient values of 0.480 is higher than the tabulated 'r' value of 0.444 for the degree of freedom at 0.05 level of significant. The table also indicates that there is no significant co relation in between left hand ratio (2D:4D) ($r = .142$) therefore the calculated 'r' values of 0.444 needed to be significant for the 18 degree of freedom at 0.05 level of confidence.

Discussion & conclusion

Our hypotheses were only partly supported. There was a greater proportion of right-handers in the male basketball players compared to the left-handers; moreover, both right and left hander players samples had lower digit ratios than controls. However, there were no statistically significant differences for either Nutritional Assessment or digit ratio between those selected for the next stage of talent development and those not selected, although it is important to keep in mind that these samples are already highly selected when they reach this point in the talent development process. Smaller digit ratios than right-handers in both dominant and non-dominant hands. The relationship between digit ratio and nutritional has rarely been considered in sport research.

Given the evidence of general effects in the athletes versus the normal population, two explanations are possible. First, it may be that the mechanisms driving digit ratio and Nutritional Assessment effects operate early in development and therefore have no influence on decisions later in development (i.e., after their influence has occurred). For example, if the 2D:4D effect is driven by endurance-related mechanisms (as proposed by Manning, Morris & Caswell, 2007) it may be that these mechanisms are important for distinguishing elite athletes from the general population but not from similarly skilled peers at points in development where other performance factors might be more important. Previous research examining the physiological demands of elite basketball highlights the intermittent nature of basketball play (i.e., long periods of low activity followed by short periods of high intensity), which might decrease the relevance of endurance-related capacities for explaining performance differences between similarly skilled athlete peers. Second, talent selection decisions such as the ones examined in the current study occur often during an athlete's career and it is possible that laterality and digit ratio effects are "strong" enough to explain general differences in performance/attainment between extreme groups (e.g., athletes and non athletes) but insufficient to explain subtle differences between those selected at a single stage of talent development. Moreover predictors of performance are largely unstable across development, particularly the relationships between variables related to performance in childhood or adolescence and performance as an adult (Baker, Schorer, & Copley, 2012). Future work may wish to explore the stability of laterality and digit ratio effects across athlete development. Collectively these results add to an emerging database supporting the influence of Nutritional Assessment and digit ratio on sport attainment. Moreover the overall influence of these effects throughout the athlete development process (and therefore the mechanism of this effect) is largely unknown. Understanding the mechanisms of these effects and how they might differ by sex provides an important opportunity for future research.

University Basketball Players participating in varsity sports had significantly lower 2D:4D ratios than their left hander varsity student counterparts. These findings are consistent with those of other studies for male athletes (e.g. Manning & Taylor, 2001) and female athletes (e.g. Paul et al., 2006). Manning (2002b) found that male

and female skiers had significantly smaller 2D:4D ratios than non-skiers. In our study, a smaller 2D:4D ratio among right hander appears to be consistent with participation in basketball sports. Overall, we found that right hander players had smaller 2D:4D ratios than left hander. It has been well established that the 2D:4D ratio is a sexually dimorphic trait, with males having smaller ratios than females (Manning et al., 1998, 2000). However, it is interesting to note that this pattern remains among athletes; right hand players had significantly smaller 2D:4D ratios than did left hander players, a result also found in skiers (Manning, 2002b).

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