

## Original Research Article

# Measuring impact of Surya Namaskar and Pranayama for management of child obesity in India

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### ABSTRACT

**Background:** Obesity is fast becoming the developed world's greatest health problem. Moreover, childhood obesity is a major public health crisis nationally and internationally. The prevalence of childhood obesity has increased over few years. It is caused by imbalance between calorie intake and calories utilized.

**Methods:** The current paper analyses the impact of Surya Namaskar and Pranayama on management of child obesity. For this purpose, a group of 120 respondents were selected for a 4-month program to measure that whether the program can improve their living standards or not.

**Results:** The result revealed positive impact on the obesity of the participants, further the variables of their medical condition and living standards improvement is identified.

**Conclusions:** One variable Rate\_yoga\_1 is predicting the Overall\_quality of Surya Namaskar and Pranayama. Further, four variables medi\_conImp\_3, medi\_conImp\_2, medi\_conImp\_5 and medi\_conImp\_4 are predicting the medical condition improvement under session of Surya Namaskar and Pranayama, and two variables Livi\_stanimpr\_4 and Livi\_stanimpr\_3 are predicting the living standard improvement under session of Surya Namaskar and Pranayama.

**Keywords:** Child, Obesity, Pranayama, Surya Namaskar

### INTRODUCTION

Obesity is a major public health crisis among children and adults. The range of weights for individuals if greater than the ideal weight, which is considered healthy for the particular height, is termed as either overweight or obese. Childhood-related obesity is an increasing concern with respect to the health and well-being of the child. Body mass index (BMI), a measure of weight with relation to height, is not only used as an outcome measure to determine obesity but also as a useful anthropometric index for cardiovascular risk. For children between 2 and 19 years, BMI is plotted on the CDC growth chart to check for the corresponding age and sex related percentile.<sup>1</sup> Imbalance between caloric intake of the child

and the calories utilized (for growth, development, metabolism, and physical activities) due to excess use of food or beverages, leads to obesity and a bigger problem in developed as well as in developing countries. Overweight and obesity in childhood are known to have significant impact on both physical and psychological health. Overweight and obese children are likely to stay obese into adulthood and more likely to develop non-communicable diseases like diabetes and cardiovascular diseases at a younger age.<sup>2</sup>

The mechanism of obesity development is not fully understood, and it is believed to be a disorder with multiple causes including excessive sugar intake by soft drink, increased portion size, and steady decline in

physical activity have been playing major roles in the rising rates of obesity all around the world. Childhood obesity can profoundly affect children's physical health, social, and emotional well-being, and self-esteem. It is also associated with poor academic performance and a lower quality of life experienced by the child. Many comorbid conditions like metabolic, cardiovascular, orthopedic, neurological, hepatic, pulmonary, and renal disorders are also seen in association with childhood obesity.

The objectives of the study are to measure the differences in the weight before and after the Surya Namaskar and Pranayama course and to measure overall impact of session for improvement of overall quality, Medical condition improvement and living standards improvement by Surya Namaskar and Pranayama.

### **Literature review**

There are some behavioral factors which can cause obesity. Sometimes children eat more or consume more energy via food and beverages which are not utilized appropriately (CDCP, 2009).<sup>2</sup> Children may eat large portions of food, foods high in sugar, and energy-rich foods. Hence, energy intake is higher than energy expenditure. So, this may lead to weight gain in children (CDCP, 2009).<sup>2</sup>

According to the world survey statistics, childhood obesity statistics has dramatically multiplied in kids and quadrupled in teenagers in the previous 30 years.<sup>3</sup> The rate of youngsters aged 6-11 years in the United States who were obese expanded from 7% in 1980 to about 18% in 2012. In 2012, more than 33% of kids and youths were overweight or obese. In some of the countries like Virginia the obesity rate is steadily increasing but the obesity statistic rate two times more than the new national average. But according to the child obesity statistics there is no change in obesity prevalence in youth or adults between 2003-2004 and 2011-2012. Obesity prevalence remains high and thus it is important to continue surveillance.<sup>3</sup>

Review of the literature investigates factors behind poor diet and offers numerous insights into how parental factors may impact on obesity in children.<sup>4</sup> They note that children learn by modeling parents' and peers' preferences, intake and willingness to try new foods. Availability of, and repeated exposure to, healthy foods is key to developing preferences and can overcome dislike of foods. Mealtime structure is important with evidence suggesting that families who eat together consume more healthy foods. Furthermore, eating out or watching TV while eating is associated with a higher intake of fat. Parental feeding style is also significant. The author's found that authoritative feeding (determining which foods are offered, allowing the child to choose, and providing rationale for healthy options) is associated with positive cognitions about healthy foods and healthier intake.

Interestingly authoritarian restriction of "junk-food" is associated with increased desire for unhealthy food and higher weight.<sup>5</sup>

Childhood obesity can be described as those children who are above the normal weight for their height and age. If not corrected, being obese as a child can lead to further problems as an adult. If unchecked, as adults they are running the risk of having diabetes, high cholesterol, high blood pressure, and heart disease.<sup>1</sup> Therefore, it is important to identify the issue and begin to take steps at a young age to correct your weight.

There are many ways that people can combat the problem of obesity. Parents of children can help in several of these areas. The first is getting kids out to exercise. Sitting in front of a television, computer or game console can be a cause of obesity. Get the kids outside to play or into an organized sports activity can help in getting the children moving and towards better condition. Another way that parents can help is by monitoring the eating habits. A good, well balanced, and nutritional meal is a good start, along with limiting the between meal snacks.<sup>6</sup>

It seems encouraging children to eat a healthy diet and exercise more is the route to success against childhood obesity. The aforementioned Let's Move initiative is focused on doing just that. But is childhood obesity taken seriously enough for such campaigns to work?<sup>7</sup>

A recent report from the CDC found that 30.2% of children and adolescents in the US misperceive their weight status. Around 48% of obese boys and 36% of obese girls consider their weight to be normal, according to the report.<sup>2</sup>

A 2013 study published in the journal *Maternal and Child Nutrition* found that 62% of parents of obese children perceive their child as being of a healthy weight. Parents should be talking with their child's pediatrician about how to attain a healthy weight and make healthier choices with their child - even if the pediatrician doesn't bring it up.<sup>8</sup>

### **METHODS**

To the best of researcher knowledge, there are some studies in the context of the Indian Cement industry, which attempt to capture the unique dimension on welfare activities inside and outside the workplace. The present study followed both exploratory and descriptive research approach. Exploratory research is carried out via review of existing literatures in formation of Hypothesis. The purpose of this research is not to construct a fresh theory, but to investigate the research questions and fulfil research objectives based on empirical research and secondary data.

Respondents profile: The study includes 240 respondents on which experiment was conducted. The children

selected were of age between 5-15 years with BMI above 25. In present research, the participants were selected using convenience sampling (using a cross-sectional design). The sample of the present study represented the population with respect to demographic dimensions i.e. gender and age. Care was taken to make the sample representative of the actual population.

For achieving the objective of this study and to conduct the investigation, data was collected from both primary and secondary sources.

**Primary data source**

Primary data was collected from participants of the experiment. This study involves primary data collection through structured questionnaire filled by participants of Pranayama and Surya Namaskar during the experiment.

**Secondary data source**

Secondary data was collected through books, periodicals, journals, research papers, and case-study, websites, articles, and newspapers.

**RESULTS**

Further, the perceptions of the beneficiaries, as the differences in the various reading as an impact of Surya Namaskar and Pranayama course is found significant, to measure the impact of Surya Namaskar and Pranayama course is separately measured to know the better results on the health of respondents that came as a result of Surya Namaskar and Pranayama. For this purpose, first the impact of Surya Namaskar among the participants are separately measured.

To test the difference in weight before and after the Surya Namaskar course on given parameters, Paired sample ‘t’ test (also called dependent ‘t’ test) is applied.<sup>9</sup> Paired sample t-test is a statistical technique that is used to

compare two population means in the case of two samples that are correlated.

**Table 1: Demographic profile of respondents.**

	Frequency	%
<b>Age</b>		
0-5	22	9
5-10	140	58
10-15	78	33
Total	240	100.0
<b>Gender</b>		
Male	158	66
Female	82	34
Total	240	100.0
<b>Weight</b>		
Below 60	40	17
60-80	46	19
Above 80	154	64
Total	240	100.0

Mathematically,  $H_0: \mu_B = \mu_A$ : an insignificant difference exists for Weight before and after the Surya Namaskar course.

The test primarily measures the significance of gap between the respondents before and after the Surya Namaskar course. The outputs produced are shown in table below. The first part of table describes the descriptive statistics for variables related to FAT before and after. The paired samples test results of the dependent t-test for both Surya Namaskar are presented in later part of table.

To test the difference in weight before and after the Pranayama course on given parameters, paired sample ‘t’ test (also called dependent ‘t’ test) is applied. Paired sample t-test is a statistical technique that is used to compare two population means in the case of two samples that are correlated.

**Table 2: Paired samples t test for impact of Surya Namaskar on FAT.**

Paired samples statistics									
		Mean	N	Std. deviation	Std. error mean				
Pair 1	FAT_Bef	33.8065	120	0.06303	0.00814				
	FAT_aft	27.9543	120	0.15639	0.02019				
Paired samples correlations									
		N		Correlation	Sig.				
Pair 1	FAT_Bef and FAT_aft		120	0.065	0.621				
Paired samples test									
Paired differences									
		Mean	Std. deviation	Std. error mean	95% Confidence Interval of the difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	FAT_Bef-FAT_aft	5.8521	0.16476	0.02127	5.80960	5.89473	275.131	59	0.000

**Table 3: Paired samples t test for impact of Pranayama on weight.**

Paired samples statistics									
		Mean	N	Std. deviation	Std. error mean				
Pair 1	Weight_bef	77.2500	120	0.47389	0.06118				
	Weight_aft	71.7500	120	1.28386	0.16575				
Paired samples correlations									
			N	Correlation	Sig.				
Pair 1	Weight_bef and Weight_aft		120	0.494	0.000				
Paired samples test									
Paired differences									
		Mean	Std. deviation	Std. error mean	95% Confidence Interval of the difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Weight_bef-Weight_aft	5.50000	1.12747	0.14556	5.20874	5.79126	37.786	59	0.000

**Table 4: Multiple regression analysis result-respondents' views.**

Variables	Variable name	Adj. R2	Beta	ANOVA	Sig.
Overall quality of rating yoga	Rate_yoga_1	0.108	0.283	15.399	0.000
Medical condition improvement	medi_conImp_3	0.288	0.286	13.007	0.000
	medi_conImp_2		0.298		
	medi_conImp_5		0.218		
	medi_conImp_4		0.245		
Living standard improvement	Livi_stanimpr_4	0.070	0.256	5.490	0.005
	Livi_stanimpr_3		-0.232		

Mathematically,  $H_0: \mu_B = \mu_A$ : an insignificant difference exists for weight before and after the Pranayama course.

Further, as per the objective (to measure the overall impact of Surya Namaskar and Pranayama) the agreement of the respondents related with the various areas are checked with the broader hypothesis. The perceptions of the beneficiaries were sought in relation to overall impact of the session. The following hypothesis was developed:

$H_1$ : The attributes configuring Overall impact of session significantly influence overall quality, Medical condition improvement and living standards improvement of Surya Namaskar and Pranayama.

To identify key variables in Surya Namaskar and Pranayama session multivariate regression analysis has been used with SPSS-19 software and results were shown in Table 4.

As per the result points in Table 4, it can be revealed that alternative hypothesis is accepted and only one variable Rate\_yoga\_1 is predicting the Overall quality of Surya Namaskar and Pranayama. Further, four variables medi\_conImp\_3, medi\_conImp\_2, medi\_conImp\_5 and medi\_conImp\_4 are predicting the Medical condition improvement under session of Surya Namaskar and Pranayama, and two variables Livi\_stanimpr\_4 and Livi\_stanimpr\_3 are predicting the living standard

improvement under session of Surya Namaskar and Pranayama.

## DISCUSSION

The result showed a positive gap difference between the FAT of the respondents before and after the use of the Surya Namaskar course.<sup>10</sup> Alternate hypothesis is accepted, and we can say that the FAT is significantly decreased ( $p < 0.05$ ) as  $\mu_B$  (33.8065)  $>$   $\mu_A$  (27.9543). It can also be revealed that a positive gap difference between the weight of the respondents before and after the use of the Pranayama course. Alternate hypothesis is accepted, and we can say that the weight is significantly decreased ( $p < 0.05$ ) as  $\mu_B$  (77.2500)  $>$   $\mu_A$  (71.7500). Further the variables for overall improvement, medical condition and living standard improvement under session of Surya Namaskar and Pranayama was found significant. One of the best things about Yoga for obese children is the fact that it can be taught to all age levels. It can help to restore balance (both physical and emotional) as well as provide a calming sense of security.<sup>11</sup> Incorporating Yoga into a child's schedule can be a building block in which to add other healthy lifestyle changes.<sup>12</sup> In the study, our subjects participated in less physical activities than their non-obese peers during school days and at weekends, and their physical activity during the evenings and weekends was much lower than that during school days. Home- and family-based physical activity that can be performed alone may be the best way to increase

energy consumption in obese adolescents because they are less likely to participate in group physical activities. Consequently, yoga training may be effective in controlling some metabolic syndrome factors in obese adolescent boys. Future investigations are demanded to establish and expand the results of the present study and to compare the metabolic effects of yoga training with those of conventional exercise. The pride and sense of accomplishment an overweight child can feel after finishing a Yoga session might just go a long way toward helping parents and healthcare practitioners reduce the effects of childhood obesity and the many health issues that are associated with it.<sup>13</sup>

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**Annexure: Major heads and their SPSS codes.**

Type	Major heads	Variables name in SPSS
Demographic profile	Age	Gender
	Gender	Age
	Weight (in kg)	Weight
	Body fat (in%)	Body_Fat
Quality of session	Ease of physical movement pre-session	Rate_yoga_1
	Ease of physical movement post-session	Rate_yoga_2
	Smoothness of 'flow' between poses	Rate_yoga_3
	Time spent in each pose	Rate_yoga_4
	Providing adjustments to alignment	Rate_yoga_5
	Providing modifications to poses	Rate_yoga_6
	Overall Difficulty of poses during sessions	Rate_yoga_7
	Overall time period spent	Rate_yoga_8
Medical condition improvement	Physical and psychological improvement in obesity	medi_conImp_1
	Decreased body weight significantly	medi_conImp_2
	Decrease the abdominal growth	medi_conImp_3
	Low cholesterol	medi_conImp_4
	Decrease in low-density lipoprotein	medi_conImp_5
	Low fasting glucose	medi_conImp_6
Improvement in living standard	It improves aspect of quality of Life	Livi_stanimpr_1
	Feeling responsible about yourself	Livi_stanimpr_2
	Enjoying physical activities	Livi_stanimpr_3
	Enhancement in social and behavioural contacts	Livi_stanimpr_4
	Improvement in ability to work	Livi_stanimpr_5
	Approaches towards food is improved	Livi_stanimpr_6
	Improvement in the quality of life	Livi_stanimpr_7
	Feel young and good shaped body	Livi_stanimpr_8
	Adherence to yoga program makes more active lifestyle	Livi_stanimpr_9
	overall quality of life and health improved	Livi_stanimpr_10