



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2019; 5(5): 319-325  
[www.allresearchjournal.com](http://www.allresearchjournal.com)  
Received: 21-03-2019  
Accepted: 25-04-2019

**Dr. Ekta Bhambri Marwaha**  
Assistant Professor,  
Department of Applied  
Psychology, S.P.M College,  
University of Delhi,  
New Delhi, India

## Subjective wellbeing among university students & physical activity patterns

**Dr. Ekta Bhambri Marwaha**

DOI: <https://doi.org/10.22271/allresearch.2019.v5.i5d.11004>

### Abstract

**Introduction:** Physical activity improves people's physical health by enhancing functional capacity, decreasing the risk of illness, improving body composition, and promoting weight loss. Due to their involvement in educational and co-curricular activities, university students are vulnerable to losing emphasis on maintaining healthy levels of physical activity. Prior studies have also found that physical activity has psychological benefits, such as enhanced mood and reduction in anxiety & depression. Furthermore, physical activity has a broad impact on subjective well-being. Adult physical activity levels in India have been observed to be falling in recent years. However, substantial research on university students' physical activity is lacking in the Indian context.

**Objectives:** (1) To investigate the subjective well-being of male & female college students (2) To examine if any difference existed between college students who were involved in active exercise and those who were low in physical exercise / sedentary with respect to subjective well-being, (3) To study the relationship between physical activity & subjective well-being.

**Methodology:** The sample of the present study consisted of 80 college students out of which (40M, 40 F) and 40 were indulging in high physical activity & 40 were indulging in low activity as analyzed through IPAQ. The tool used for the present study was the Subjective well-being scale (SUBI) by Nagpal & Sell (1985) for the World Health Organization. The inventory consisted of 40 items and 11 factorial dimensions and a global score. The other measure used was the International Physical activity questionnaire (IPAQ) short form, consisting of 7 questions and three dimensions: highly active, moderately active & Inactive.

**Results:** The findings suggested no significant difference in global scores of subjective well-being and its 11 dimensions between male & female students. whereas Active students showed higher levels of subjective well-being compared to those who were moderately exercising and those who were inactive. The results also indicate a strong relationship between subjective well-being and physical activity.

**Conclusion:** These results support the notion that regular exercise increases wellbeing. It appears that even a brief bout of physical activity can lead to an improvement in subjective well-being.

**Keywords:** Subjective well-being, physical activity, high activity, moderate & low activity

### Introduction

Physical activity patterns among individuals of all ages have changed dramatically in recent years. Earlier research indicates that important influences on these changes include changing lifestyles, gender disparities, economic status, socio-cultural influences, educational attainment, occupational qualities, and other determinants are major influences on these changes. Many field workers in various nations, including India, have observed a decrease in physical activity patterns among children, adolescents, and adults. This development may be influenced by increased young participation in virtual games, cell phones, television, computers, and social media. This outcome is also influenced by increased use of automotive forms of transportation and decreased participation in outdoor activities. Furthermore, among young adults, the prevalence of health conditions such as overweight, obesity, coronary artery disease, hypertension, diabetes mellitus, depression, and so on has been identified as an important factor associated with these conditions, and insufficient physical activity has been identified as an important factor associated with these conditions.

### Correspondence

**Dr. Ekta Bhambri Marwaha**  
Assistant Professor,  
Department of Applied  
Psychology, S.P.M College,  
University of Delhi,  
New Delhi, India

Physical activity Cross-sectional and longitudinal research shows that physical activity levels during emerging adulthood continue to follow the decreasing trend that emerged in adolescence (Caspersen *et al.*, 2000; Kjønnsen *et al.*, 2008; Troiano *et al.*, 2008) [7, 14, 28].

Approximately one-third of emerging adults engage in no leisure-time physical activity (Barnes, 2007; Pleis, Lucas, & Ward, 2009) [3, 17]. Given that emerging adulthood is characterized by shifting values and goals, it would not be surprising if physical activity motivation was also shown to shift during emerging adulthood. Various cross-sectional and longitudinal research studies on physical activity have revealed a decline in physical activity levels in emerging adulthood, as they did in adolescence (Caspersen *et al.*, 2000; Kjønnsen *et al.*, 2008; Troiano *et al.*, 2008) [5, 14, 28]. According to Barnes (2007) [3] and Pleis, Lucas, & Ward (2009) [17], one-third of emerging adults don't exercise during their free time. Given that emerging adulthood is marked by shifting ideals and objectives, it is not surprising that physical exercise motivation shifts over this period.

A survey conducted by Indian Council of Medical Research (ICMR) found 54.4% of the 14227 individuals surveyed in India were found to be inactive, compared to 31.9% who were active, and 13.7% who were extremely active. This trend is concerning because the percentage of the inactive population appears to be large. Several researches indicate that youth physical activity levels in several countries are dropping when compared to recommended levels.

Physical activity is related to reduced overall mortality (Lee *et al.*, 2012) [29], improved cardiovascular and musculoskeletal health, reduced risks of obesity and stroke (Lee *et al.*, 2012) [29], lower mental health burden (Chekroud *et al.*, 2018) [30], and reduced symptoms of depression and anxiety.

According to Hallal *et al.* (2012) [31], physical activity is essential for sustaining beneficial health. Physical Activity has been conceptualized as any bodily movement produced by skeletal muscles that requires energy expenditure and includes activities completed while working, playing, household chores and exercise, or sport (Craig *et al.*, 2003) [32]. Adequate Physical Activity is associated with considerable health benefits in young people that can progress into adulthood (Hallal *et al.*, 2012; Janssen & Leblanc, 2010; WHO, 2010) [31, 33, 34]. Young adults engage in Physical Activity for several reasons. These explanations are provided by the SLOTH (sleep, leisure-time, occupation, transportation, and home-based activities) model (Pratt *et al.*, 2003) [32], which also outlines the different types of physical activity. Studies on young people's levels of physical activity are extremely rare, despite the health-related Physical Activity recommendations' expectations that young adults be physically active in all aspects of life (Adeniyi *et al.*, 2016; Odunaiya *et al.*, 2010; Senbanjo & Oshikoya, 2010) [35, 36, 37].

Physical activity is necessary for optimal health (Hallal *et al.*, 2012) [31]. Physical activity is defined by Craig *et al.* (2003), as any skeletal muscular movement that necessitates the expenditure of energy, such as those performed when working, playing, completing chores, exercising, or engaging in sports. Adequate physical activity throughout adolescence has been linked to major health advantages that last into adulthood (Hallal *et al.*, 2012; Janssen & Leblanc,

2010; WHO, 2010) [31, 33, 34]. The association between physical exercise and beneficial health-related characteristics is generally understudied, despite the World Health Organization's definition of health as a condition of whole physical, mental, and social well-being and not only the absence of sickness or infirmity (WHO, 2014) [38]. Positive health-related notions tend to be important in gaining a more complete understanding of the relationship between physical activity and health. One of these positive health-related notions is subjective well-being (SWB). SWB is a broad concept that refers to an individual's assessments of their own life, including global judgments such as overall life satisfaction, emotional responses, and satisfaction in specific domains such as health (Diener *et al.*, 1999) [39]. A significant issue in social health is subjective well-being, which reflects a fulfilling life. Subjective well-being is divided into two parts: cognitive and emotional. The cognitive component is a decision-making process in which people estimate their quality of life using a personal set of criteria. Happiness is the affective component, and it is an emotional assessment of the degree of intensity and content of a person's positive personal experiences of happy occurrences in their life. A person with a high level of subjective well-being not only has better levels of life satisfaction, self-esteem, pleasant feelings, and attitudes but also better control over tensions, negative thoughts, ideas, and feelings.

Physical activity could be one component that improves SWB. The current study aims to determine whether and under what conditions physical exercise is connected to SWB. Understanding the relationship between Physical Activity levels and subjective well-being outcomes could also be useful in developing and improving evidence-based public health interventions for promoting subjective well-being (SWB) among university students.

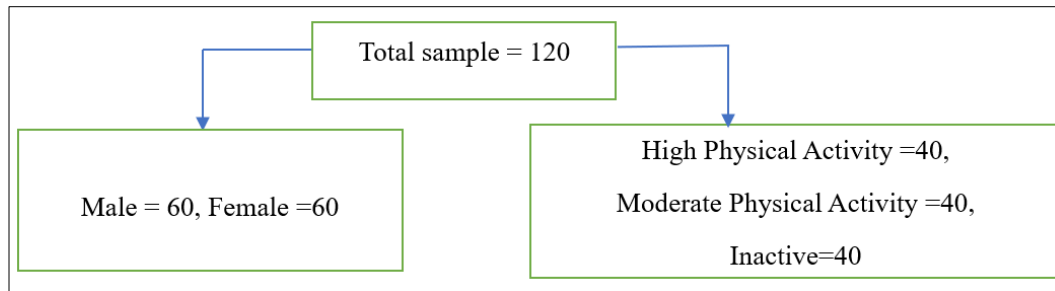
**The objectives of the present study were:** (1) To investigate the subjective well-being of male & female college students (2) To examine if any difference existed between college students who were involved in active exercise and those who were low in physical exercise / sedentary with respect to subjective well-being, (3) To study the relationship between physical activity & subjective wellbeing.

### Sample

For the research, 120 participants were taken in the age group of 18-25 years studying in various undergraduate & postgraduate courses.

**Inclusionary Criteria:** Participants were screened using the following eligibility criteria: (a) age range 18-25 yrs; (b) studying in undergraduate & postgraduate colleges willingness to participate in a research study.

**Exclusionary Criteria:** Participants were screened using the following exclusionary criteria: (a) not suffering from any chronic illness and physical disability not taking any kind of drug; (b) at present not taking any kind of intervention, such as yoga, acupressure, any kind of psychotherapy, etc.



**Research Tools**

**The research tools which were used were**

- **International Physical activity questionnaire (IPAQ):** IPAQ comprises of 4 questionnaires -Long (5 activity domains asked independently) and short (4 generic items) versions for use by either telephone methods or self-administered. The questionnaire's objective is to offer standard tools that may be used to gather data on physical activity that is connected to health that is similar across borders. The short form of the IPAQ instrument having 7 questions will be used. The questions will be about the time spent physically active in the last 7 days. In this study, International Physical Quantity Questionnaire (IPAQ) will be administered. According to the revised scoring protocol, three levels (categories) of physical activity are proposed: Category 1: Low, Category 2: Moderate, Category 3: High
- **Subjective Well-Being Inventory (SUBI):** developed by Dr. H. Sell and Dr. R. Nagpal was used to measure feelings of well-being or ill-being as experienced by an individual or a group of individuals in various day-to-

day life concerns. The inventory measures 11 factorial dimensions which are: General well-being- Positive affect, Expectation- achievement congruence, Confidence in coping, Transcendence, Family group support, social support, Primary group concern, Inadequate mental mastery, perceived ill-health, Deficiency in social contacts, General well-being- Negative affect and overall global score along with norms are provided.

**Results and Analysis**

The present research was carried out to explore patterns of physical activity & subjective well-being among university students in the age group of 18-24 yrs. The data generated from the study were analyzed using both descriptive and inferential statistics. The mean and standard deviation of all the variables were computed as well as t was computed to find out if differences existed in subjective well-being dimensions among university students who are high on physical activity, moderately active, and low on physical activity. The relationship between physical activity & subjective well-being was also studied.

**Table 1:** Shows Mean, S.D., and 't' value of male and female students on the subjective well-being

Subjective Wellbeing Dimensions	Male N=60		Female N=60		t value
	Mean	SD	Mean	SD	
General Well-being- positive affect	6.22	1.09	5.97	1.07	1.03
Expectations- Achievement Congruence	5.80	1.04	5.52	.84	1.29
Confidence in Coping	6.55	.932	5.88	.883	1.32
Transcendence	6.15	.804	5.95	.985	.99
Family Group Support	6.65	1.07	6.62	.95	.11
Social Support	6.37	1.00	6.02	.80	1.72
Primary Group Concern	6.12	1.01	5.90	.95	1.02
Inadequate Mental Mastery	13.85	1.71	13.75	1.40	.285
Perceived Ill Health	12.62	1.56	12.55	1.37	.228
Deficiency in Social Contacts	6.32	.94	6.10	.87	1.10
General Wellbeing-negative affect	6.05	.98	5.85	.97	.912
Total	82.40	3.75	80.60	2.80	2.50

\* $p < 0.05$ , \*\* $p < 0.01$

Table 1 shows the comparison of subjective well-being dimensions among male & female university students. From the table above it can be observed that the t-test values obtained show no significant difference in subjective well-

being dimensions based on gender among male & female university students. However, the Mean value indicates that overall subjective well-being experienced by male students was more in comparison to female students.

**Table 2:** Shows Mean, S.D. & ANOVA (F) value of the 3 groups i.e., Physical Active, Moderately Active & Inactive students

Subjective Wellbeing Dimensions	Physical exercise (Active) N=40		Physical exercise (Moderate) N=40		Non-Physical exercise N=40		F value
	Mean	SD	Mean	SD	Mean	SD	
General Well-being- positive affect	6.42	1.12	6.00	1.10	5.35	1.02	9.87**
Expectations- Achievement Congruence	5.92	1.04	5.55	.81	5.22	.69	6.55*
Confidence in Coping	6.55	.93	6.30	.96	5.75	.89	7.70**
Transcendence	6.42	.93	6.05	1.08	5.67	.85	6.06*
Family Group Support	6.75	.89	6.67	.91	6.52	.96	.613

Social Support	6.50	1.01	6.22	.76	5.82	.84	5.94*
Primary Group Concern	6.27	1.03	6.05	.95	5.52	.96	6.08*
Inadequate Mental Mastery	14.60	1.78	13.92	1.50	13.20	1.52	7.57**
Perceived ill Health	12.60	1.69	12.47	1.32	11.57	1.27	5.70*
Deficiency in Social Contacts	6.40	.95	6.17	.93	5.67	.97	5.75*
General Wellbeing-negative affect	6.15	1.07	5.85	.97	5.27	.98	6.61*
Total	84.42	4.56	80.57	2.60	76.12	2.82	75.50**

\*p<0.05, \*\*p<0.01

The above table shows the Mean, S.D. & ANOVA (F) value of the 3 groups of students i.e., those who are Highly Physical Active, Moderately Active & Inactive students. The results indicate a significant difference at .01 level on General Well-being- positive affect, Confidence in Coping, Inadequate Mental Mastery, & on overall subjective well-being. Whereas a significant difference was observed at .05 level on Expectations- Achievement Congruence,

Transcendence, Social Support, Primary Group Concern, Perceived ill Health, Deficiency in Social Contacts, and General well-being negative. On family group support no significant difference was observed. Those students who were doing daily physical activity experienced higher subjective well-being in comparison to the other two groups on all 11 dimensions. Mean value indicates that in comparison to the inactive group, the moderately active group experienced greater subjective well-being.

**Table 3:** Post Hoc (Tuckey test) for Physical Active, Moderately Active & Inactive students on subjective wellbeing

Subjective Wellbeing Dimensions	A v/s B	A v/s C	B v/s C
General Well-being- positive affect	-	**	*
Expectations- Achievement Congruence	-	**	-
Confidence in Coping	-	**	*
Transcendence	-	*	-
Family Group Support	-	-	-
Social Support	-	*	-
Primary Group Concern	-	*	*
Inadequate Mental Mastery	-	**	-
Perceived ill Health	-	*	-
Deficiency in Social Contacts	-	*	-
General Wellbeing-negative affect	-	*	*
Total	**	**	**

Grp A: High Physical Activity, Grp B: Moderately Physical Activity, Grp C: Inactive

The above table shows the post hoc test of the 3 groups of students i.e., those who are Highly Physical Active, Moderately Active & Inactive students on the dimensions of subjective wellbeing. The results indicate a significant difference at .01 level on General Well-being- positive affect, Expectations- Achievement Congruence, Confidence in Coping, Inadequate Mental Mastery, & on overall subjective well-being between Grp A & C i.e., High Physical Activity & Inactive Group of students. Whereas a significant difference was observed at .05 level on Transcendence, Social Support, Primary Group Concern,

Perceived ill Health, Deficiency in Social Contacts, and General well-being negative. On family group support no significant difference was observed. Whereas between Grp B & C i.e Moderately Active & Inactive group significant difference at .05 level was observed between General Well-being- positive affect, Confidence in Coping, Primary Group Concern, and General well-being negative. Whereas a significant difference at.01 level was observed among the 3 groups i.e. High Physically active, moderately Active Group & Inactive group of university students on overall subjective wellbeing.

**Table 4:** Shows the correlation between Physical Active, Physically Inactive students & subjective well being

-	High Physical Activity (Active)	Physical Activity (Sedentary)	Subjective Wellbeing
Subjective Well being	.61**	-.77**	1
Physical Activity (Active)		1	
Physical Activity (Sedentary)	1		

\*p<0.05, \*\*p<0.01

The table above shows the relationship between high physical activity, Sedentary physical activity, and overall subjective well-being of university students. The results indicate a significant and positive relationship at .01 level between the high physical activity group of students and overall subjective well-being. whereas a significant and negative relationship at .01 level was seen between inactive physical activity and overall subjective well-being.

**Discussion**

The present study was undertaken to explore the pattern of physical activity & various dimensions of subjective well-being among university students. Physical activity levels among adults in India have been observed to be falling in recent years. Due to their commitment to academic and co-curricular activities, as well as the various other components of daily routines, university students are at risk of losing emphasis on maintaining healthy levels of physical exercise.

Young people increasingly spend most of their free time engaging in sedentary activities like screen time, sedentary socializing, and inactive modes of transportation, which makes sedentary behavior (or sitting) common in developed nations (Biddle, Petrolini, & Pearson 2014) <sup>[40]</sup>. According to the Sedentary Activity Research Network (2012), sedentary activity includes sitting or lying down during the day with little to no energy expenditure. Sedentary lifestyles are having negative consequences on university students' physical and mental health, which is a major public health problem.

The first objective of the present study was to investigate the subjective well-being of male & female undergraduates & postgraduate students. Table 1 shows the comparison on subjective well-being dimensions among male & female university students. From the table, it can be inferred that the t-test values obtained show no significant difference in subjective well-being dimensions based on gender among male & female university students. However, the Mean value indicates that overall subjective well-being experienced by male students was more in comparison to female students. In a study by Akter (2015) <sup>[41]</sup>, contrasting results were reported which indicated that females are higher on psychological well-being than males. In additional studies on gender differences and SWB, Rathi (2007) <sup>[18]</sup>, Gill (2007) <sup>[13]</sup>, and Kotar (2013) <sup>[15]</sup> found that there is no significant mean difference in psychological well-being between male and female college students.

The research on gender differences in SWB has not yet produced a conclusion. because the object and measurement vary among trials. Meisenberg and Woodley (2015) <sup>[16]</sup> examined gender disparities in SWB using a significant amount of cross-national data. Their original prediction was that in patriarchal societies where men playing with traditional gender roles had a higher level of SWB than women, while in societies that accepted gender equality, women had a higher level of SWB than men or at least the same as men.

The second objective was to examine if any difference existed between university students who were involved in active exercise and those who were low in physical exercise / sedentary with respect to subjective well-being. The above table shows the Mean, S.D. & ANOVA (F) value of the 3 groups of students i.e., those who are Highly Physical Active, Moderately Active & Inactive students. The results indicate a significant difference at .01 level on General Well-being- positive affect, Confidence in Coping, Inadequate Mental Mastery, & on overall subjective well-being. Whereas a significant difference was observed at .05 level on Expectations- Achievement Congruence, Transcendence, Social Support, Primary Group Concern, Perceived ill Health, Deficiency in Social Contacts, and General well-being negative. On family group support no significant difference was observed. Those students who were doing daily physical activity experienced higher subjective well-being in comparison to the other two groups on all 11 dimensions. The mean value indicates that in comparison to the inactive group, the moderately active group experienced greater subjective well-being, and a significant difference at .05 level was obtained on the dimensions of General Well-being- positive affect, Confidence in Coping, Primary Group Concern, and Deficiency in Social Contacts.

Table 3 shows the post hoc test of the 3 groups of students i.e., those who are Highly Physical Active, Moderately Active & Inactive students on the dimensions of subjective well-being. The results indicate a significant difference at .01 level on General Well-being- positive affect, Expectations-Achievement Congruence, Confidence in Coping, Inadequate Mental Mastery, & on overall subjective well-being between Grp A & C i.e., High Physical Activity & Inactive Group of students. Whereas a significant difference was observed at .05 level on Transcendence, Social Support, Primary Group Concern, Perceived ill Health, Deficiency in Social Contacts, and General well-being negative. On family group support no significant difference was observed. Whereas between Grp B & C i.e Moderately Active & Inactive group significant difference at .05 level was observed between General Well-being- positive affect, Confidence in Coping, Primary Group Concern, and General well-being negative. Whereas a significant difference at .01 level was observed among the 3 groups i.e. High Physically active, moderately Active Group & Inactive group of university students on overall subjective well-being. Physical activity is crucial for leading a healthy lifestyle and is essential for the treatment and prevention of many health issues by easing depressive and anxiety symptoms and enhancing wellbeing. Physical activity is any movement made by the skeletal muscles that causes an energy expenditure, whereas physical exercise is a subset of physical activity that is planned, controlled, and repeated with the aim of enhancing or maintaining physical fitness. During physical exercise, neurotransmitters and trophic factors are released, i.e., endorphins, vascular endothelial growth factor (VEGF), serotonin, and brain-derived neurotrophic factor (BDNF), which help to improve mental health, especially in mood responses. Though limited, prior research on the connection between PA intensity and subjective well-being has contradictory findings. For instance, Wicker and Frick 30 found that among adults from 28 European countries with an average age of 51.1 years, moderate-intensity PA had a significant positive relationship with SWB and vigorous-intensity PA displayed a negative association with SWB using a single-item question about life satisfaction as a measure of SWB. It appears that the relationship between PA and SWB may differ by age groups because Shennar-Golan and Walter's study of this relationship in adolescents aged 13 to 18 found that only vigorous-intensity PA was associated with life satisfaction while light-intensity PA and moderate-intensity PA showed no significant relationship with life satisfaction. One may argue that because physical fitness reduces with age, vigorous-intensity PA may feel more stressful to older persons, reducing the advantages of PA on SWB. Therefore, this possible age difference suggests that future PA interventions should consider the intensity of PA as a central element when aiming to improve SWB. Additionally, while previous studies on the relationship between the intensity of PA and subjective well-being have mostly used life satisfaction as the single indicator of SWB, in the present study cognitive as well as affective component is taken into consideration i.e 11 dimensions of SWB and overall score is considered.

The third objective was to study the relationship between physical activity & subjective well-being. Table 3 shows the relationship between high physical activity, Sedentary physical activity, and overall subjective well-being of

university students. The results indicate a significant and positive relationship at .01 level between the high physical activity group of students and overall subjective well-being, whereas a significant and negative relationship at .01 level was seen between inactive physical activity and overall subjective well-being. In a study, Downward and Rasciute (2011) <sup>[10]</sup> observed the significance of participation frequency and duration. They reported that participation duration and frequency had a substantial favorable impact on SWB. In a study that also looked at frequency and duration effects, Wicker *et al.* (2015) <sup>[26]</sup> found that a workout program lasting 30 minutes that was done twice a week for four weeks significantly increased SWB. Thus, results indicate that high physical activity increases overall subjective wellbeing of students in the age range of 18-24 years and inactive students experience overall low subjective wellbeing.

### Conclusion

Physical activity could be one component that improves SWB. The current study aims to determine whether and under what conditions physical exercise is connected to SWB among 18-24 years university students. It also aims to understand the relationship between Physical Activity levels and subjective well-being. The results indicates that among the three groups of physical activity the one's who are involved in high physical activity experience highest subjective well being overall and on other dimensions of subjective well being followed by moderate and least subjective well being was reported in inactive group. It was observed that there was no significant difference on SWB, and 11 dimensions experienced by students based on gender. The results indicate a significant and positive relationship between the high physical activity group of students and overall subjective well-being. whereas a significant and negative relationship was seen between inactive physical activity and overall subjective well-being.

### References

1. Akhter S. Psychological well being in students of Gender difference. The International Journal of Indian psychology; c2015, 2(4).
2. Arnett JJ. Learning to stand alone: The contemporary American transition to adulthood in cultural and historical context. Human Development. 1998;41(5-6):295-315.
3. Barnes P. Physical activity among adults: United States, 2000 and 2005. Hyattsville, MD: US Department of Health and Human Services, CDC; c2007.
4. Brownson RC, Baker EA, Housemann RA, Brennan LK, Bacak SJ. Environmental and policy determinants of physical activity in the United States. American Journal of Public Health. 2001;91(12):1995-2003. <http://dx.doi.org/10.2105/AJPH.91.12.1995>
5. Caspersen CJ, Pereira MA, Curran KM. Changes in physical activity patterns in the United States, by sex and cross-sectional age. Medicine & Science in Sports & Exercise. 2000;32(9):1601-1609. <http://dx.doi.org/10.1097/00005768-200009000-00013>
6. Chisholm L, Hurrelmann K. Adolescence in modern Europe. Pluralized transition patterns and their implications for personal and social risks. Journal of adolescence. 1995 Apr 1;18(2):129-58.

7. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public health reports. 1985 Mar;100(2):126.
8. Hearing CM, Chang WC, Szuhany KL, *et al.* Physical exercise for treatment of mood disorders: a critical review Curr. Behav .Neurosci. Rep. 2016;3:350-359. [10.1007/s40473-016-0089-y](https://doi.org/10.1007/s40473-016-0089-y)
9. Thomsen KR. Measuring anhedonia: impaired ability to pursue, experience, and learn about reward. Frontiers in psychology. 2015 Sep 17;6:1409. [10.3389/fpsyg.2015.00147](https://doi.org/10.3389/fpsyg.2015.00147)
10. Downward P, Rasciute S. Does sport make you happy? An analysis of the well-being derived from sports participation. International review of applied economics. 2011 May 1;25(3):331-48.
11. Erikson EH. Identity youth and crisis. WW Norton & company; c1968.
12. Gardner B, de Bruijn GJ, Lally P. A systematic review and meta-analysis of applications of the self-report habit index to nutrition and physical activity behaviours. Annals of Behavioral Medicine. 2011 Oct 1;42(2):174-87. <http://dx.doi.org/10.1007/s12160-011-9282-0>
13. Gill N. A study of psychological well being among college students of Haryana in Relation to coping Behaviour. M. Phil. Dissertation in Education, Chowdhary Devi Lal University, Sirsa; c2007.
14. Kjønniksen L, Torsheim T, Wold B. Tracking of leisure-time physical activity during adolescence and young adulthood: a 10-year longitudinal study. International Journal of Behavioral Nutrition and Physical Activity. 2008 Dec;5(1):69-79. <http://dx.doi.org/10.1186/1479-5868-5-69>
15. Kotar AB. A comparative study of psychological well-being among arts and science college students. Acme Int J Multidiscipl Res. 2013;1(9):9-12.
16. Meisenberg G, Woodley MA. Gender differences in subjective well-being and their relationships with gender equality. Journal of happiness studies. 2015 Dec;16:1539-55.
17. Pleis JR, Lucas JW, Ward BW. Summary health statistics for U.S. adults: National Health Interview Survey, 2008. Vital and Health Statistics. Series 10, Data from the National Health Survey. 2009;(242):1-157.
18. Rathi Neerpal. Meaning in life and psychological well being in pre adolescents and Adolescents. Journal of the Indian Academy of Applied Psychology. 2007;33(3):31-38.
19. Riddoch CJ, Andersen LB, Wedderkopp N, Harro M, Klasson-Heggebø L, Sardinha LB, *et al.* Physical activity levels and patterns of 9- and 15-yr-old European children. Medicine & Science in Sports & Exercise. 2004;36(1):86-92. <http://dx.doi.org/10.1249/01.MSS.0000106174.43932.92>
20. Sallis JF, Prochaska JJ, Taylor WC. The Research File. Medicine & Science in Sports & Exercise.;32(5):963-75. <http://dx.doi.org/10.1097/00005768-200005000-00014>
21. Shennar-Golan V, Walter O. Physical activity intensity among adolescents and association with parent-adolescent relationship and well-being. American

- journal of men's health. 2018 Sep;12(5):1530-40. DOI:10.1177/1557988318768600
22. Telama RI, Yang X. Decline of physical activity from youth to young adulthood in Finland. *Medicine & Science in Sports & Exercise*. 2000 Sep 1;32(9):1617-22. <http://dx.doi.org/10.1097/00005768-200009000-00015>
  23. Verplanken B, Melkevik O. Predicting habit: The case of physical exercise. *Psychology of sport and exercise*. 2008 Jan 1;9(1):15-26. <http://dx.doi.org/10.1016/j.psychsport.2007.01.002>.
  24. Weiss MR. Motivating kids in physical activity. *President's Council on Physical Fitness and Sports Research Digest*. 2000;3(11):1-8.
  25. Wicker P, Frick B. The relationship between intensity and duration of physical activity and subjective well-being. *Eur J Public Health* 2015;25(5):868-872. DOI:10.1093/eurpub/ckv131
  26. Wicker P, Coates D, Breuer C. The effect of a four-week fitness program on satisfaction with health and life. *Int J Public Health*. 2015;60:41-47.
  27. William T. Grant Foundation Commission on Work, Family, and Citizenship. The forgotten half" Non-college-bound youth in America. Washington, DC: William T. Grant Found; c1988.
  28. Troiano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, McDowell M. Physical activity in the United States measured by accelerometer. *Medicine and science in sports and exercise*. 2008 Jan 1;40(1):181.
  29. Lee SH, Yang J, Goddard ME, Visscher PM, Wray NR. Estimation of pleiotropy between complex diseases using single-nucleotide polymorphism-derived genomic relationships and restricted maximum likelihood. *Bioinformatics*. 2012 Oct 1;28(19):2540-2.
  30. Chekroud SR, Gueorguieva R, Zheutlin AB, Paulus M, Krumholz HM, Krystal JH, *et al*. Association between physical exercise and mental health in 1·2 million individuals in the USA between 2011 and 2015: a cross-sectional study. *The lancet psychiatry*. 2018 Sep 1;5(9):739-46.
  31. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U. Global physical activity levels: surveillance progress, pitfalls, and prospects. *The lancet*. 2012 Jul 21;380(9838):247-57.
  32. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, Pratt M, *et al*. International physical activity questionnaire: 12-country reliability and validity. *Medicine & science in sports & exercise*. 2003 Aug 1;35(8):1381-95.
  33. Janssen I, LeBlanc AG. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International journal of behavioral nutrition and physical activity*. 2010 Dec;7(1):1-6.
  34. World Health Organization. World health statistics 2010. World Health Organization; c2010 May 10.
  35. Adeniyi DA, Wei Z, Yongquan Y. Automated web usage data mining and recommendation system using K-Nearest Neighbor (KNN) classification method. *Applied Computing and Informatics*. 2016 Jan 1;12(1):90-108.
  36. Odunaiya NA, Ayodele OA, Oguntibeju OO. Physical activity levels of senior secondary school students in Ibadan, western Nigeria. *West Indian Medical Journal*; c2010 Oct 1, 59(5).
  37. Senbanjo IO, Oshikoya KA. Physical activity and body mass index of school children and adolescents in Abeokuta, Southwest Nigeria. *World Journal of Pediatrics*. 2010 Aug;6:217-22.
  38. WHO Expert Committee on the Selection, Use of Essential Medicines, World Health Organization. The Selection and Use of Essential Medicines: Report of the WHO Expert Committee, 2013 (including the 18th WHO Model List of Essential Medicines and the 4th WHO Model List of Essential Medicines for Children). World Health Organization; c2014.
  39. Diener E, Suh EM, Lucas RE, Smith HL. Subjective well-being: Three decades of progress. *Psychological bulletin*. 1999 Mar;125(2):276.
  40. Biddle SJ, Petrolini I, Pearson N. Interventions designed to reduce sedentary behaviours in young people: a review of reviews. *British journal of sports medicine*. 2014 Feb 1;48(3):182-6.
  41. Akter MP, Mekhilef S, Tan NM, Akagi H. Modified model predictive control of a bidirectional AC–DC converter based on Lyapunov function for energy storage systems. *IEEE Transactions on Industrial Electronics*. 2015 Sep 14;63(2):704-15.