REVIEW ARTICLE

Physical activity in Pakistani perspective: issues, implications, and recommendations

Muhammad Badar Habib,[1] Muhammad Tahir Nazeer,[2] Masood Mahfooz,[3] Muhammad Shoaib Safdar[4]

Abstract

It has been established that the benefits of physical activity on physical, psychological and social aspects of humans are substantially correlated with cardiovascular disorders, obesity, cancer, social anxieties and depressions, and enhanced socio-economic profile. In children and adolescents, physical activity has been correlated with academic achievements, social harmony and mental health. Similarly, in adults/old people, physical activity has been of variable benefits, bringing the chances of prolonged healthier lives. Though substantial work has been reported globally, there still is a paucity of literature in Pakistan regarding various aspects of physical activity. The current narrative review was planned to summarise the research work conducted in, or has emanated from, Pakistan in teens/college/school and university students, and adults from Pakistan on associated aspects of physical activity, its present scenario, pitfalls, future horizons, and to ultimately deduce gaps in research areas which can be taken up for the directional approach to enhance physical activity within the Pakistani community.

Keywords: Physical activity, Pakistan, Literature review.

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Introduction

The detailed benefits of physical activity (PA), such as physical, psychological and social aspects for humans have been well correlated with cardio-vascular disorders, obesity, cancer, social anxieties, depressions, and enhanced socio-economic profile.[1] These benefits are experienced by individuals belonging to different age, gender and occupation groups.[2] In children and adolescents, PA has been strongly correlated with academic achievements, social harmony and mental health. Similarly, in adults and old people, PA has been of variable benefits, bringing them chances of prolonged and healthier lives. On similar patterns, studies on PA in males and females from different geographic entities have revealed that females are more likely to be physically inactive and, hence, prone to various cardiovascular disorders, obesity, diabetes and associated conditions.

Despite its well-known and established benefits, a huge population does not indulge in adequate PA in order to attain sustained and healthier lives. The dawn of this century has witnessed increasing trend in recommendations/prescriptions by physicians/nurses of PA to sedentary patients. This has been dubbed as 'Green Prescription' which is a health professional's written advice to a patient to be physically active. Various studies have shown its substantial effects in enhancing PA.[3]

Globally, PA has gained avid attention in the last decade or so, and academic writings in the form of research articles, narrative reviews, systematic reviews, mixed-method reviews, and meta-analyses are swarming online on all the related aspects of PA regarding prevalence in various age/gender/occupation groups, monitored surveillance, effectiveness of interventions, motives and passion and measurement techniques for PA.[1,4,5] However, research work on all these aspects of PA from Pakistan is scanty and patchy.

Pakistan is the sixth most populous country with one of the highest population growth rates in the world. As per the latest census of 2017, its present population is of 207 million.[6] It is also a briskly urbanising country of Asia where the proportion of urban population has risen from 17% in 1951 to 37% in 2010.[7] Metropolitan centres are on the rise and, as per an estimate, by 2025, almost half of the population will be living in the cities.[8] Summing up, Pakistan is at a threshold of major demographic transition. Population boom and migration are the main factors considered responsible for this rapid urbanisation. Though considered an indicator of development through enhanced opportunities of growth and prosperity, urbanisation is posing threats and challenges to better governance and urban service delivery. The conditions of urban centres will deteriorate further with time if these development dilemmas are not addressed properly, timely and systematically.

Some of the issues of concern brought about by urbanisation are overcrowding, unhygienic housing and drainage, lack of basic services, congested transportation

[1]Department of Physical Education and Sports Sciences, The Islamia University of Bahawalpur, [2]Department of Sports Sciences, University of Punjab, Lahore, Pakistan, [3]Centre for Sports and Exercise Sciences, University of Malaya, Kuala Lumpur, Malaysia, [4]Department of Pulmonology, Shahida Islam Medical College, Lodhra, Pakistan.

Correspondence: Muhammad Badar Habib. Email: badar.habib@iub.edu.pk

systems, hampered education, joblessness and, most of all, ill-health. It can rightly be put in another way that all the malice brought about by urbanisation, in fact, has led to decreased public healthcare and, hence, ill-health of the masses. Adding further to the misery, mechanisation of urban areas has transitioned lifestyles to viewing more television and videos, staying indoors with a sedentary lifestyle, and ultimately decreasing PA.[9] This has resultantly led to high figures of obesity, cardiovascular diseases (CVDs), infectious diseases and allied non-communicable diseases (NCDs), especially in Asian countries, including Pakistan.[4,10]

Methods

Data regarding allied aspects of PA conducted in, or emanating from, Pakistan was obtained through Medline, PubMed and Google Scholar databases up to May 2020. Advanced options for these search engines were appropriately utilised with key words, including combinations of PA, physical fitness, Pakistan, exercise, sports, physical training, prevalence, and physical inactivity. Full research articles, case studies, cross-sectional studies, studies conducted on Pakistani populations residing in Pakistan, and studies conducted up to May 2020 were included. Review articles, systemic reviews, meta-analyses, studies conducted on migrant Pakistani populations or Pakistanis living abroad were excluded. The Critical Appraisals Skills Programme (CASP) was utilised for the assessment of the validity of each published work.[11] The checklist for quantitative studies was used to assess quality of study design for each published source. Justification of choices was made in each category and the studies were accepted for inclusion if they met each of the choices as recommended by the CASP.

Results

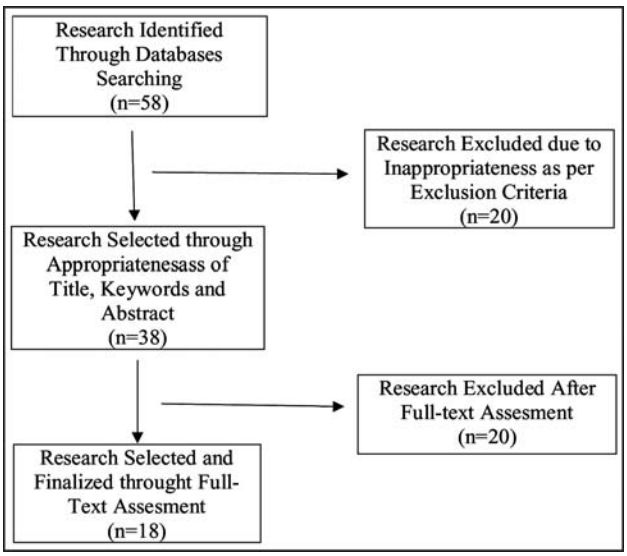

Figure: Flow diagram of search results.

Of the 58 studies retrieved, 38(65.5%) were selected on the basis of title, abstract and key words (Figure). Search results were exported to Endnote reference management software. Full texts were assessed by two independent researchers separately, and 18 (47.3%) publications were selected for final analysis 11(61%) targeting teenagers, school, college and university students, and 7(39%) targeting adult Pakistani population. Only 3(16.7%) articles were published in Impact Factor (IF) journals before January 2020 (Master Journal List as per Clarivate Analytics)[12] (Table).

Discussion

There are eight higher education institutions of Pakistan which are offering bachelor's (BS), masters (MS) and doctoral (PhD) degree programmes in Sports Sciences and Physical Education. However, a thorough review of literature revealed only 18 scientific papers (Table) published in various peer-reviewed national and international scientific journals related to one or other aspect of PA up to May 2020. In addition, an MS thesis from the University of Jyväskylä, Finland, Feroze[13] on perceptions about PA, and a book by Cambridge Scholars Publishing, United Kingdom, Din[5] on health outcomes of Pakistani population have also been published which, however, were not selected for final inclusion in the current review. Out of these 18 research publications, 11 targeted the teenagers, school, college and university students, while the remaining 7 reported research work on adult Pakistani population. Only 3 articles were published in IF journals.

The first published document by Samir, Mahmud[14] from Pakistan emanated from the Agha Khan University (AKU), Karachi, which was a cross-sectional study and was aimed at estimating PA prevalence and its associative barriers in obese attendants of a health centre. International Physical Activity Questionnaire (IPAQ) was used for assessing PA level. Results revealed that among the 350 participants, only 23.8% were physically active. The family structure and gender had significant interaction with PA of the participants. Lack of economic facilities, motivation and skill, spouse and family support, and time constraints were major barriers in the way of PA.[15] Obesity and body mass index (BMI) were dubbed as major contributory factors to physical inactivity. Though the research work was confined to a specific occupation group and incorporated a smaller number of respondents, it probably paved the way for future research work. The World Health Survey of 70 countries (http://www.who.int/gho/database/en/),[16] previously reported 40.4% inactivity through 5610 Pakistani respondents.[17]

Studies targeting teenagers, school, college and university students

The first study on school-going children (n=339) aged 11-17 years from Karachi was conducted with an aim of determining factors related to overweight and obesity.[18] Unhealthy food, especially sweetened beverages, conjoined with inadequate level of PA in these children and there were considered main factors responsible for obesity and overweight in the sample.

Another study revealed that both males (n=220) and females (n=130) had a substantially positive attitude towards PA and considered it an activity of joy and pleasure.[19] Association of BMI, obesity and unhealthy diet with physically inactivity was reported in 2013, while studying 6-16-year-old school-going children.[20] From the total respondents of 370, 35% of the children were overweight. Level of PA was ascertained through number of hours watching TV and playing games both at school and at home), and 49% of overweight children were involved in watching television more than 2 hours in a day.[20] A comparative study of PA level between school and college students (n=171) Ahmed, Mehraj[21] noticed that school students had better PA level (67%) compared to their college counterparts (38%). However, overall, the PA level of students was not satisfactory. Furthermore, large number of students had unhealthy dietary habits and were overweight. Parental and school-associated factors affecting levels of PA were assessed among school-goers (n=501) in Hyderabad, Pakistan,[22] showing that 40% of the total students either walked or rode to school on bicycle.

A study in Lahore targeted students at University of Lahore (n=200) for the assessment of physical inactivity. Data collected through pre-tested questionnaire revealed 69% of the respondents to be physically inactive.[23] Sedentary lifestyles, restricted social environment, construction pattern of building, and lack of awareness contributed to physically inactivity.

Many research articles regarding various associated aspects of PA were published in 2018. Two studies were published in the Journal of Pakistan Medical Association, an IF journal of Pakistan. The first one reported result on PA level among secondary school adolescents (n= 216) from Karachi.[24] Of the total respondents, 70% had moderate and 30% had low PA levels. Boys of public school with parental support for sports had higher PA levels compared to the students at private schools. Physical inactivity among adolescents was dubbed as an alarming public health threat.[24] The second was a cross-sectional study aimed at determining factors associated with participation of female medical students (n=403) of a university located in a rural setting.[25] Regular PA was noticed only in 24% (n=22) participants. PA was considered the main extrinsic motivation factor and prevalence of sports-associated injuries were too high. It was recommended that the female students may be trained accordingly for appropriate sports so that lesser injuries may be encountered.

A study assessed attitude of Pakistani university students (n=384) towards sports and PA.[26] A specially designed and pretested proforma, the Students' Attitude Towards Physical Activity (SATPA), was used for the survey. Results revealed that students had a positive and favourable attitude towards PA with cricket being most popular sports. While reporting the prevalent barriers for college students of Peshawar (n=400),[27] lack of facilities, sports-gear, playgrounds and parental/students' interest were main factors considered barriers towards appropriate PA. The last research article of 2018 was aimed at comparing PA levels of rural and urban students (n=156) of two universities of Lahore.[28] The PA levels of rural students were found to be substantially better than urban students. Furthermore, higher obesity and BMI were noted among urban students.

Keeping in view the research cited above, it may be concluded that very basic research has been conducted in Pakistan regarding PA assessment and the factors affecting it. It can also be concluded that an appropriate level of PA is lacking in Pakistani teens and students. Obesity and BMI are strongly related to PA levels. Though there is a positive attitude towards PA in general, inadequate levels of PA are prevalent mostly among urban inhabitants.

The school-going children are one of the vital segments of any society. Nutrition and environment along with the lifestyles of school-going children, in fact, improve their growth, development, bodyweight and BMI, and, hence, the general health status of these children.[28,29] They need highest level of PA and ultimate physical fitness owing to their specific phase of life, enhanced learning, cognitive and perception-oriented exposures and grade-based education systems. It has been well elucidated that increased PA in children leads to enhanced physical fitness, brightened cognitive responses and, hence, appropriate achievement levels in terms of grades and positions. The relation between PA, physical fitness and cognitive responses in school-going children is widely being studied in the developed countries.[19,29,30] However, there still is a paucity of literature on this aspect in the developing and under-developed countries, such as Pakistan.

As per the Economic Survey of Pakistan-2018-19, there were 50.6 million school enrolments in 2017-18. This is a substantial increase of 5% compared to the preceding year.[31] The government aimed at enhancing this percentage of school enrolments by 5% in the following year. Scanty

studies on school-going and collegiate students summarised above have emanated from Pakistan which have addressed factors associated with obesity, attitudes towards PA, levels of PA and allied aspects. To date, there is a dearth of literature on physical fitness levels and motor performance ability (MPA) of school-goers as affected by various socio-economic determinants, such as age, gender, nativity, family status, level of family income, distance from school, type of conveyance used for school, level of education, and level of parents' education. Furthermore, the fact cannot be overlooked that in the last 30 years, neither has Pakistan been able to grab any medal in Olympics nor does it seem to have any chances in the foreseeable future.

Lately, the School Education Department in Punjab has devised certain standard operating procedures (SOPs) for maintaining the health profile of all staff and students of public and private schools across the province.[32] These SOPs have been circulated vide official notification to all the schools, and measures are being taken for its strict implementation.[32]

Studies targeting the adult Pakistani population

Of the total studies reviewed, 7 focused on deducing association of various infectious/non-infectious diseases and health status of adults with PA levels. While comparing the PA level with BMI, an open prospective label study Ezzati, Vander Hoorn[30] analysed 179 patients at a cardiology outpatient department (OPD) in Kashmir. Overall, sedentary lifestyle was prevalent, and 105 (58.7%) subjects had no or low PA in their routine daily lives. Medium-level PA was observed in 34.8% of male and 39.8% of female subjects ($p>0.05$). Mean BMI was 26.86±5.46 (26.94±5.843 in males and 26.82±5.250 in females; $p>0.05$). Mean BMI was 28.40±5.684, 27.10+4.791 and 26.17±4.697 in subjects with no, low and medium-level PA, respectively. It was concluded that sedentary lifestyle leads to obesity in both genders at equal proportion.

While assessing functional status, PA level and association with depression in elderly respondents, a study used multi-stage clustering technique along with a geriatric depression scale.[33] It was revealed that the respondents spending >310 minutes per week in PA were 60% less depressed than those spending <120 minutes per week. Hence, a strong association between PA level and depression was ascertained.

A correlation of PA with essential hypertension was elucidated for inhabitants (n=563) of Tharparkar desert in Pakistan.[30] Data revealed that inhabitants with sedentary lifestyles had higher prevalence of essential hypertension (19.2%) compared to those with activity-filled lives (1.9%) though the difference was statistically non-significant ($p\leq0.05$) probably because of the low sample.

In a community-based cross-sectional study from rural population of Khyber Pakhtunkhwah, healthy subjects (n=2569) were evaluated following the WHO's STEP wise approach to noncommunicable disease (NCD) risk-factor Surveillance (STEPS) regarding the prevalence of blood pressure (BP), BMI, diabetes mellitus (DM) and PA level.[31] PA was noted for 23% of the study population and higher risk of cardiovascular disorders was associated with lower PA level. Similar pattern of association was studied for type II DM (T2DM) in a study published in the Pakistani Journal of Medical Sciences, which is another Pakistani IF journal.[34] Diabetic patients (n=200) from different clinical settings were included to study trends in PA using the European Prospective Investigation into Cancer (EPIC) Norfolk Physical Activity Questionnaire (EPAQ2). A lower-than-adequate level of PA in these diabetic patients was noticed. It was dubbed as the main restraint in maintaining health in these patients. The year 2019 witnessed an interesting Editorial on prescribing PA as medicine and the vitality of green prescription for Pakistani inhabitants.[33] Strategic directions and recommendations were provided to alleviate the pandemic of physical inactivity through incorporation of PA in all prescriptions by the physicians, especially in Pakistan.

The sum-up of research work conducted on allied aspects of PA and physical inactivity in Pakistani adults is an indication that there is scanty work reported in this regard. Furthermore, the work which has been reported is quite basic and does not incorporate the latest international standards as being prescribed by the newer global research and the WHO. It also delineates that Pakistani adult population is adopting a sedentary lifestyle and maintains below-optimal PA in their lifestyles. The WHO recommends that adults aged 18-64 years should engage in at least 150 minutes of moderate-intensity PA per week or at least 75 minutes of vigorous-intensity PA or an equivalent of moderate- and vigorous-intensity PA to achieve health benefits. However, even a minimum of 15 minutes of PA per day can decrease mortality by 14%, potentially adding three years to life.[35]

Pakistan has the highest incidence of NCDs in Asian countries.[36] About 50% of the population, approximately 80 million individuals, suffers from NCDs.[36] According to a study,[37] 81% Pakistanis do not indulge in satisfactory level of PA which results in a plethora of diseases. Therefore, detecting the factors associated with participation in PA is necessary to promote PA in Pakistan.[38] Lack of motivation and passion, fewer fitness clubs in an area, and low level of family support are a few of the factors considered the main barriers.

Table: Scientific publications emanating from Pakistan on various aspects of physical activity (PA).

S.No	Title	Study/Publication Type	Sample (n)	Year	Journal
Teens, School/College-goers and University Students					
1	The association of sugar-sweetened beverage consumption and inadequate physical activity with overweight and obesity in school-going children and adolescents of Pakistan[41]	Cross Sectional	339 Males (181) Females (158)	2011	Archives of Disease in Childhood
2	A study regarding the college students' attitudes towards physical activities[42]	Cross Sectional	350 Males (220) Females (130)	2012	International Journal of Academic Research in Business and Social Sciences
3	Association of BMI and life style: a comparative study on school going children (aged 6-16 years) of Lahore[43]	Cross Sectional	370 Males (194) Females (176)	2013	Annals
4	Exploring nutritional status, physical activity and body mass index of Pakistani teens[44]	Cross Sectional	171 Males (98) Females (73)	2016	International Journal of Research in Medical Sciences
5	Parental and school influences on physical activity Levels of high school students in Hyderabad, Pakistan[45]	Cross Sectional	501 Males (255) Females (246)	2016	Journal of Ayub Medical College Abotabad
6	Prevalence of physical inactivity among the students of University Institute of Diet and Nutritional Sciences, University of Lahore[46]	Cross Sectional	200 Males (38) Females (162)	2017	Asian Journal of Allied Health Sciences
7	Physical activity levels and their correlates among secondary school adolescents in a township of Karachi, Pakistan[47]	Cross Sectional	216 Males (85) Females (131)	2018	Journal of Pakistan Medical Association*
8	Motivation and factors affecting sports participation: A cross-sectional study on female medical students in Pakistan[48]	Cross Sectional	403 Females	2018	Journal of Pakistan Medical Association*
9	Attitude of young students towards sports and physical activities[49]	Cross Sectional	384 Males (262) Females (122)	2018	Global Management Journal for Academic and Corporate Studies
10	Assessment of the prevailing barriers in promoting physical activities among The inter level college students of District Peshawar[50]	Cross Sectional	400 Males (200) Females (200)	2018	The Spark
11	Comparison of physical fitness between rural and urban physical therapy students studying in Lahore, Pakistan[51]	Cross Sectional	156 Males (75) Females (81)	2018	Annals of Punjab Medical College
Adult Pakistani Population					
1	Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan[52]	Questionnaire	350 Males (163) Females (187)	2011	BMC Research Notes
2	Association of low physical activity with high body mass index in both genders[53]	Open Label Prospective	179 Males (89) Females (90)	2014	Khyber Medical University Journal
3	Depression and its association with functional status and physical activity in the elderly in Karachi, Pakistan[54]	Cross Sectional	953 Males (506) Females (447)	2014	Asian Journal of Psychiatry*
4	Association of physical activity, nature of job, and exercise with the prevalence of essential hypertension in the Tharparkar desert[55]	Descriptive Population Based	563 Males (295) Females (268)	2015	International Journal of Medical Science and Public Health
5	Prevalence of cardiovascular risk factors in the Rural areas of Khyber Pakhtunkhwa[56]	Cross Sectional	2569 Males (1569) Females (1000)	2015	Pakistan Heart Journal
6	Pattern of physical activity among persons with Type-2 diabetes with special consideration to daily routine[57]	Cross Sectional	200 Males (104) Females (96)	2016	Pakistan Journal of Medical Science*
7	Prescribing physical activity as medicine — the need to look ahead and beyond[58]	Editorial	-	2019	Pakistan Armed Forces Medical Journal

*Journals with impact factor as per Master Journal List of the Clarivate Analytics.

In order to reduce the pandemic of physical inability, the WHO has launched a global action plan to reduce physical inactivity by 10% in 2025, and 15% by 2030, and implementation strategies have thus been started globally. In order to incorporate all activity domains from people of various walks of life, two separate questionnaires have been devised and approved by the WHO, namely IPAQ and the Global Physical Activity Questionnaire (GPAQ), which have not yet been utilised in studies dealing with Pakistani adult population.[39]

Following the global approach, it is the need of the hour to incorporate the latest patterns of research and the latest survey questionnaires as in research, like the Revised Motives for Physical Activity Measure (MPAM-R) Wilson, Rodgers[40] which ascertains five key motives for participation in the PA as being Fitness, Appearance, Competence/Challenge, Social and Enjoyment. Considering the geographical and socio-economic profile of Pakistan, different motives/scales need to be validated for efficacious assessment of levels of PA in Pakistani population.

Conclusion

Though Pakistani population, in general, has a positive and favourable attitude towards PA, levels of PA are far from being adequate. This is leading to an extensive prevalence of various infectious and non-infectious diseases. The work reported from Pakistan is quite sketchy and patchy, and only basic aspects of PA have been addressed. Following the global approach, the latest patterns of research and latest survey questionnaires/ proformas in research need to be adopted and used. and, considering the geographical and socio-economic profile of Pakistan, different motives/scales need to be validated for efficacious assessment of PA levels in Pakistan. A national knowledge, attitude and practice (KAP) analysis for PA is also recommended which will help the government and all stakeholders in devising directional initiatives for attaining adequate levels of PA that may lead to an ultimate healthy community.

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References

1. Brunet J, Sabiston CM. Exploring motivation for physical activity across the adult lifespan. Psychol. Sport Exer. 2011; 12: 99-105.
2. Church TS, Thomas DM, Tudor-Locke C, Katzmarzyk PT, Earnest CP, Rodarte RQ, et al. Trends over 5 decades in US occupation-related physical activity and their associations with obesity. PLoS One 2011; 6: e19657.
3. Villapol ME, Richter S, Petrova K. Value co-creation and opportunities in health care and wellbeing. The case of the green prescription. Research Papers 2018; 73.
4. Ding D, Lawson KD, Kolbe-Alexander TL, Finkelstein EA, Katzmarzyk PT, Van-Mechelen W, et al. Lancet physical activity series 2 executive committee. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. Lancet 2016; 388: 1331-24.
5. Din I. Health Outcomes and the Pakistani Population. UK: Cambridge Scholars Publishing; 2014.
6. Hassan B, Ahmed R, Li B, Noor A, Hassan Zu. A comprehensive study capturing vision loss burden in Pakistan (1990-2025): Findings from the Global Burden of Disease (GBD) 2017 study. PLoS One 2019; 14: e0216492.
7. Aaltonen S, Leskinen T, Morris T, Alen M, Kaprio J, Liukkonen J, et al. Motives for and barriers to physical activity in twin pairs discordant for leisure time physical activity for 30 years. Int J Sports Med 2012; 33: 157-63.
8. Addae B, Oppelt N. Land-use/land-cover change analysis and urban growth modelling in the Greater Accra Metropolitan Area (GAMA), Ghana. Urban Sci 2019; 3: 26.
9. Van-Kann DH, de Vries SI, Schipperijn J, de-Vries NK, Jansen MW, Kremers SP. Schoolyard characteristics, physical activity, and sedentary behavior: combining GPS and accelerometry. J Sch Health 2016; 86: 913-21.
10. Sirard JR, Pate RR. Physical activity assessment in children and adolescents. Sports Med 2001; 31: 439-54.
11. Carter AG, Creedy DK, Sidebotham M. Evaluation of tools used to measure critical thinking development in nursing and midwifery undergraduate students: a systematic review. Nurse Educ Today 2015; 35: 864-74.
12. Gamble A. Biological Abstracts (Clarivate Analytics). The Charleston Advisor 2018; 20: 19-25.
13. Feroze F. Perceptions about physical activity and its associated benefits among employees: case study in 12 Multinational Companies in Pakistan. [Thesis]. Finland: University of Jyväskylä; 2016.
14. Samir N, Mahmud S, Khuwaja AK. Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan. BMC Res Notes 2011; 4: 174.
15. Macniven R, Bauman A, Abouzeid M. A review of population-based prevalence studies of physical activity in adults in the Asia-Pacific region. BMC Public Health 2012; 12: 41.
16. Kahan D. Adult physical inactivity prevalence in the Muslim world: Analysis of 38 countries. Prevent Med Rep 2015; 2: 71-5.
17. Khan S, Abbass SA, Khan W, Din MU. A Study Regarding the Collage Students' Attitudes towards Physical Activities. International Journal of Academic Research in Business and Social Sciences 2012; 2: 98-107.
18. Rizwan A, Akhter J, Jafar TH. The association of sugar-sweetened beverage consumption and inadequate physical activity with overweight and obesity in school-going children and adolescents in Pakistan. Arch Dis Childhood 2011; 96: 109-11.
19. 20. Shaukat F, Ahmad F, Zehra N. Association of BMI and life style: a comparative study on school going children (aged 6-16 years) of Lahore. Ann King Edward Med Uni 2013; 19: 297-304.
20. Khan K, Jameel N, Khalil R, Gul S. Exploring nutritional status, physical activity and body mass index of Pakistani teens. Int J Res Med Sci 2016; 4: 3563-9.
21. Ahmed J, Mehraj V, Jeswani GK, Rehman SU, Shah SM, Hamadeh R. Parental and school influences on physical activity levels of high school students in Hyderabad, Pakistan. J Ayub Med Coll Abbottabad 2016; 28: 110-5.
22. Rizwan B, Khan MA, Farooq S, Khalid S, Ahmad B. Prevalence of Physical Inactivity Among The Students of University Institute of Diet and Nutritional Sciences, University of Lahore. Asian J Allied Health Sci 2020; 2: 18-22.

23. Jabeen I, Zuberi R, Nanji K. Physical activity levels and their correlates among secondary school adolescents in a township of Karachi, Pakistan. J Pak Med Assoc 2018; 68: 737-43.
24. Memon AR, Ali B, Memon AR, Ahmed I, Feroz J. Motivation and factors affecting sports participation: a cross-sectional study on female medical students in Pakistan. J Pak Med Assoc 2018; 68: 1327-33.
25. Zaman S, Mian AK, Butt F. Attitude of young Students towards Sports and physical activities. GMJACS 2018; 8: 33-42.
26. Iqbal Z, Rashid A. Assessment of the prevailing barriers in promoting physical activities among the inter level college students of district Peshawar. THE SPARK 2018; 2: 82-9.
27. Mahmood T, Mujahid Z, Mahmood W, Tariq K, Salam A. Comparison of Physical Fitness Between Rural and Urban Physical Therapy Students Studying in Lahore, Pakistan. Ann Punjab Med Coll 2018; 12: 112-6.
28. Das KK, Dhundasi SA. Physical fitness.A longitudinal study among Muslim children of Bijapur (Karnataka). Indian J Physiol Pharmacol 2001; 45: 457-62.
29. Farholm A, Sorensen M. Motivation for physical activity and exercise in severe mental illness.A systematic review of intervention studies. Int J Ment Health Nurs 2016; 25: 194-205.
30. Ezzati M, Vander-Hoorn S, Rodgers A, Lopez AD, Mathers CD, Murray CJ. Potential health gains from reducing multiple risk factors. In: Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors. Volume 2. Geneva: WHO; 2004, pp 2167-90.
31. Pakistan Economic Survey 2018-19. Islamabad PMoF, Government of Pakistan. []nlin e] 2019 [Cited 2020 august 04]. Available from: URL: http://www.finance.gov.pk/survey/chapters_19/2-Agriculture.pdf.
32. Shahabuddin S, Iqbal U. Pakistan: Health Systems, Accreditation, and Databases: Pakistan's Perspective. In: Health Systems Improvement Across the Globe: Success Stories from 60 Countries. USA: CRC Press; 2017, pp 339-44.
33. Bhamani MA, Khan MM, Karim MS, Mir MU. Depression and its association with functional status and physical activity in the elderly in Karachi, Pakistan. Asian J Psychiatr 2015; 14: 46-51.
34. Abid R. Association of low physical activity with high body mass index in both genders. Khyber Med Uni J 2014; 6: 121-7.
35. Wen CP, Wai JPM, Tsai MK, Yang YC, Cheng TYD, Lee MC, et al. Minimum amount of physical activity for reduced mortality and extended life expectancy.A prospective cohort study. Lancet 2011; 378: 1244-53.
36. Wasay M, Zaidi S, Jooma R. Non communicable diseases in Pakistan: burden, challenges and way forward for health care authorities. J Pak Med Assoc 2014; 64: 1218-9.
37. Qureshi AI, Palesch YY, Barsan WG, Hanley DF, Hsu CY, Martin RL, et al. Intensive blood-pressure lowering in patients with acute cerebral hemorrhage. N Engl J Med 2016; 375: 1033-43.
38. Gardner LA, Vella SA, Magee CA. Continued participation in youth sports: the role of achievement motivation. J Appl Sport Psychol 2017; 29: 17-31.
39. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. Lancet Glob Health 2018; 6: 1077-86.
40. Wilson PM, Rodgers WM, Fraser SN. Cross-validation of the revised motivation for physical activity measure in active women. Res Q Exerc Sport 2002; 73: 471-7.
41. Rizwan A, Akhter J, Jafar TH. The association of sugar-sweetened beverage consumption and inadequate physical activity with overweight and obesity in school-going children and adolescents in Pakistan. Arch Dis Child . 2011;96:109-11. doi: 10.1136/adc.2010.193383. Epub 2010 Sep 18.
42. Khan S, Abbass SA, Khan W, Din MU. A Study Regarding the Collage Students' Attitudes towards Physical Activities. Int. j. acad. res. bus. soc. sci. 2012; 2:189.
43. Shaukat F, Ahmad F, Zehra N. Association of BMI and life style: a comparative study on school going children (aged 6-16 years) of Lahore. Ann. King Edw. Med. Univ.. 2013; 19:297-.
44. Khan K, Jameel N, Khalil R, Gul S. Exploring nutritional status, physical activity and body mass index of Pakistani teens. Int Journal Res Med Sci. 2016; 4:3563-9.
45. Ahmed J, Mehraj V, Jeswani GK, Rehman SU, Shah SM, Hamadeh R. Parental and school influences on physical activity levels of high school students in Hyderabad, Pakistan. J Ayub Med Coll Abbottabad. 2016; 28:110-5.
46. Rizwan B, Khan MA, Farooq S, Khalid S, Ahmad B. Prevalence of Physical Inactivity Among The Students of University Institute of Diet and Nutritional Sciences, University of Lahore. Asian J Allied Health Sci (AJAHS). 2020:18-22.
47. Jabeen I, Zuberi R, Nanji K. Physical activity levels and their correlates among secondary school adolescents in a township of Karachi, Pakistan. Cardio Dis. 2018; 68:737-43.
48. Memon AR, Ali B, Memon AUR, Ahmed I, Feroz J. Motivation and factors affecting sports participation: a cross-sectional study on female medical students in Pakistan. J Pak Med Assoc. 2018; 68:1327-33.
49. Zaman S, Mian AK, Butt F. Attitude of young Students towards Sports and physical activities. Global Management Journal for Academic & Corporate Studies (GMJACS) . 2018; 8:33-42.
50. Iqbal Z, Rashid A. Assessment of the prevailing barriers in promoting physical activities among the inter level college students of district Peshawar. THE SPARK 2018; 2(1):82-9.
51. Mahmood T, Mujahid Z, Mahmood W, Tariq K, Salam A. Comparison of Physical Fitness Between Rural and Urban Physical Therapy Students Studying in Lahore, Pakistan. Ann. Punjab Med. Coll.. 2018; 12:112-6.
52. Samir N, Mahmud S, Khuwaja AK. Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan. BMC Res. Notes. 2011; 4:1-7.
53. Abid R. Association of low physical activity with high body mass index in both genders. Khyber Med. Univ. J. 2014; 6:121-7.
54. Bhamani MA, Khan MM, Karim MS, Mir MU. Depression and its association with functional status and physical activity in the elderly in Karachi, Pakistan. Asian J Psychiatr. 2015; 14:46-51.
55. Umedani LV. Association of physical activity, nature of job, and exercise with the prevalence of essential hypertension in the Tharparkar desert. Int J Med Sci Public Health. 2015; 4:429-32.
56. Khan S, Iqbal S, Ullah R, Shah ST, Khan MN, Saidullah S. Prevalence of cardiovascular risk factors in the rural areas of Khyber Pakhtunkhwa. Pak Heart J. 2015; 48:147-52.
57. Arshad R, Younis BB, Masood J, Tahira M, Khurhsid S. Pattern of physical activity among persons with type 2 diabetes with special consideration to daily routine. Pak. J. Med. Sci. 2016; 32:234-8.
58. Azam N. Prescribing physical activity as medicine- the need to look ahead and beyond. Pak. Armed Forces med. j. 2019; 69:222-4.