Physical activity in Pakistani perspective: issues, implications, and recommendations
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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...
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.\(^9\)\(^{10}\)

**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**

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.\textsuperscript{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.\textsuperscript{19} Association of BMI, obesity and unhealthy diet with physically inactivity was reported in 2013, while studying 6-16-year-old school-going children.\textsuperscript{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.\textsuperscript{20} A comparative study of PA level between school and college students (n=171) Ahmed, Mehraj\textsuperscript{21} noticed that school children 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,\textsuperscript{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.\textsuperscript{23} Sedentary lifestyles, restricted social environment, construction pattern of building, and lack of awareness contributed to physically inactivity.

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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.\textsuperscript{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. These SOPs have been circulated vide official notification to all the schools, and measures are being taken for its strict implementation. 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 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 (26.9±4.834 in males and 26.82±5.250 in females; p>0.05). Mean BMI was 28.40±6.684, 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. 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. 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≤0.05) probably because of the low sample.

In a community-based cross-sectional study from rural population of Khyber Pakhtunkhawah, 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. 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. 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. 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.

Pakistan has the highest incidence of NCDs in Asian countries. About 50% of the population, approximately 80 million individuals, suffers from NCDs. According to a study, 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. 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).

<table>
<thead>
<tr>
<th>S.No</th>
<th>Title</th>
<th>Study/Publication Type</th>
<th>Sample (n)</th>
<th>Year</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Teens, School/College-goers and University Students</strong></td>
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</tr>
<tr>
<td>1</td>
<td>The association of sugar-sweetened beverage consumption and inadequate physical activity with overweight and obesity in school-going children and adolescents of Pakistan41</td>
<td>Cross Sectional</td>
<td>339 Males (181) Females (158)</td>
<td>2011</td>
<td>Archives of Disease in Childhood</td>
</tr>
<tr>
<td>2</td>
<td>A study regarding the college students’ attitudes towards physical activities42</td>
<td>Cross Sectional</td>
<td>350 Males (220) Females (130)</td>
<td>2012</td>
<td>International Journal of Academic Research in Business and Social Sciences Annals</td>
</tr>
<tr>
<td>3</td>
<td>Association of BMI and life style: a comparative study on school going children (aged 6-16 years) of Lahore43</td>
<td>Cross Sectional</td>
<td>370 Males (194) Females (176)</td>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Exploring nutritional status, physical activity and body mass index of Pakistani teens44</td>
<td>Cross Sectional</td>
<td>171 Males (98) Females (73)</td>
<td>2016</td>
<td>International Journal of Research in Medical Sciences</td>
</tr>
<tr>
<td>5</td>
<td>Parental and school influences on physical activity Levels of high school students in Hyderabad, Pakistan45</td>
<td>Cross Sectional</td>
<td>501 Males (255) Females (246)</td>
<td>2016</td>
<td>Journal of Ayub Medical College Abotabad</td>
</tr>
<tr>
<td>6</td>
<td>Prevalence of physical inactivity among the students of University Institute of Diet and Nutritional Sciences, University of Lahore46</td>
<td>Cross Sectional</td>
<td>200 Males (38) Females (162)</td>
<td>2017</td>
<td>Asian Journal of Allied Health Sciences</td>
</tr>
<tr>
<td>7</td>
<td>Physical activity levels and their correlates among secondary school adolescents in a township of Karachi, Pakistan47</td>
<td>Cross Sectional</td>
<td>216 Males (85) Females (131)</td>
<td>2018</td>
<td>Journal of Pakistan Medical Association*</td>
</tr>
<tr>
<td>8</td>
<td>Motivation and factors affecting sports participation: A cross-sectional study on female medical students in Pakistan48</td>
<td>Cross Sectional</td>
<td>403 Females</td>
<td>2018</td>
<td>Journal of Pakistan Medical Association*</td>
</tr>
<tr>
<td>9</td>
<td>Attitude of young students towards sports and physical activities49</td>
<td>Cross Sectional</td>
<td>384 Males (262) Females (122)</td>
<td>2018</td>
<td>Global Management Journal for Academic and Corporate Studies The Spark</td>
</tr>
<tr>
<td>10</td>
<td>Assessment of the prevailing barriers in promoting physical activities among the inter level college students of District Peshawar50</td>
<td>Cross Sectional</td>
<td>400 Males (200) Females (200)</td>
<td>2018</td>
<td>Annals of Punjab Medical College</td>
</tr>
<tr>
<td>11</td>
<td>Comparison of physical fitness between rural and urban physical therapy students studying in Lahore, Pakistan51</td>
<td>Cross Sectional</td>
<td>156 Males (75) Females (81)</td>
<td>2018</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Adult Pakistani Population</strong></td>
<td></td>
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<tr>
<td>1</td>
<td>Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan52</td>
<td>Questionnaire</td>
<td>350 Males (163) Females (187)</td>
<td>2011</td>
<td>BMC Research Notes</td>
</tr>
<tr>
<td>2</td>
<td>Association of low physical activity with high body mass index in both genders53</td>
<td>Open Label Prospective</td>
<td>179 Males (89) Females (90)</td>
<td>2014</td>
<td>Khyber Medical University Journal</td>
</tr>
<tr>
<td>3</td>
<td>Depression and its association with functional status and physical activity in the elderly in Karachi, Pakistan54</td>
<td>Cross Sectional</td>
<td>953 Males (506) Females (447)</td>
<td>2014</td>
<td>Asian Journal of Psychiatry*</td>
</tr>
<tr>
<td>4</td>
<td>Association of physical activity, nature of job, and exercise with the prevalence of essential hypertension in the Tharparkar desert55</td>
<td>Descriptive Population Based</td>
<td>563 Males (295) Females (268)</td>
<td>2015</td>
<td>International Journal of Medical Science and Public Health</td>
</tr>
<tr>
<td>5</td>
<td>Prevalence of cardiovascular risk factors in the Rural areas of Khyber Pakhtunkhwa56</td>
<td>Cross Sectional</td>
<td>2569 Males (1569) Females (1000)</td>
<td>2015</td>
<td>Pakistan Heart Journal</td>
</tr>
<tr>
<td>6</td>
<td>Pattern of physical activity among persons with Type-2 diabetes with special consideration to daily routine57</td>
<td>Cross Sectional</td>
<td>200 Males (104) Females (96)</td>
<td>2016</td>
<td>Pakistan Journal of Medical Science*</td>
</tr>
<tr>
<td>7</td>
<td>Prescribing physical activity as medicine — the need to look ahead and beyond58</td>
<td>Editorial</td>
<td></td>
<td>2019</td>
<td>Pakistan Armed Forces Medical Journal</td>
</tr>
</tbody>
</table>

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

J Pak Med Assoc
In order to reduce the pandemic of physical inactivity, 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, Rodgers40 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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