Perceptions of Users and Cost-Benefit Analysis of Open Air Gyms in Public Parks of National Capital Region, India

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Table of Contents

List of Tables

List of Annexures

List of Acronyms

BCR- Benefit-cost Ratio

CVDs- Cardiovascular Diseases

DALYs-Disability Adjusted Life Years

DDA- Delhi Development Authority

GBD- Global Burden of Disease

GDP- Gross Domestic Product

GST- Goods and Services Tax

HCA- Human Capital Approach

INR- Indian Rupee

INT- International

MCG- Municipal Corporation Gurugram

NCDs- Non-communicable Diseases

NCR- National Capital Region

NPV- Net Present Value

NSDP- Net State Domestic Product

OAG- Open Air Gym

RWA- Resident Welfare Association

SDG- Sustainable Development Goal

TVM- Time Value of Money

UNFPA- United Nations Population Fund

VSL- Value of Statistical Life

WHO- World Health Organization

WHO-SEAR- World Health Organization- South-east Asian Region

Glossary of Terms

Metabolic Equivalents (METs)

Metabolic Equivalents (METs) are commonly used to express the intensity of physical activities. MET is the ratio of a person's working metabolic rate relative to their resting metabolic rate. One MET is defined as the energy cost of sitting quietly and is equivalent to a caloric consumption of 1kcal/kg/hour. It is estimated that compared with sitting quietly, a person's caloric consumption is three to six times higher when being moderately active (3-6 METs) and more than six times higher when being vigorously active (>6 METs).

Global Burden of Disease (GBD) study

A systematic, scientific effort to quantify the comparative magnitude of health loss due to diseases, injuries, and risk factors by age, sex, and geographies for specific points in time.

Disability Adjusted Life Years (DALYs)

Healthy life years lost to morbidity and premature mortality due to a disease/health condition. DALYs are the sum of years of life lost (YLL) and years lived with disability (YLD).

Work Participation Rate

A measure of the proportion of a country’s working-age population that engages actively in the labor market, either by working or looking for work it provides an indication of the size

of the supply of labor available to engage in the production of goods and services, relative to the population at working age.

Gross Domestic Product (GDP)

GDP represents the monetary value of all goods and services produced within a nation's geographic borders over a specified period of time.

Labor income share of GDP

The wage share can be defined in various ways, but empirically it is usually defined as total labor compensation or labor costs over nominal GDP or gross value added.

Value of Statistical Life (VSL)

VSL is an estimate for how much people are willing to pay to reduce their risk of death.

Net State Domestic Product (NSDP)

Net State Domestic Product (NSDP) is defined as a measure, in monetary terms, of the volume of all goods and services produced within the boundaries of the State during a given period of time after deducting the wear and tear or depreciation, accounted without duplication.

Per capita NSDP

The volume of all goods and services produced within the boundaries of the State during a given period of time (after deducting the wear and tear or depreciation, accounted without duplication). divided by the number of people living there

Net Present Value

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting to analyze the profitability of a projected investment or project. Net Present Value (NPV) is the cumulative present worth of positive and negative investment cash flow using a specified rate to handle the time value of money.

Time Value of Money

The time value of money (TVM) is the concept that money available at the present time is worth more than the identical sum in the future due to its potential earning capacity. This core principle of finance holds that, provided money can earn a return, any amount of money is worth more the sooner it is received. TVM is also sometimes referred to as present discounted value.

Initial Outlay

An initial outlay refers to the initial investments needed in order to begin a given project.

Abstract

An outdoor gym consists of a variety of weather-resistant exercise equipment, which are modified configurations of conventional indoor gym equipment, requiring no power to operate and are located in open spaces (such as parks) for public use.[42,43] The provision of outdoor gyms is increasingly seen as an important strategy for promoting physical activity globally, including India.

Despite the availability of outdoor gyms (referred to as Open Air Gyms or OAGs in India) in public parks of many Indian cities, no research has been done on them in any context. The aim of this study was to analyze the viability of Open Air Gyms as an intervention for promoting physical activity levels in the National Capital Region (NCR) of India and subsequently the rest of the nation. This study was conducted in two parts: a qualitative assessment of perceptions of OAG users and providers in NCR and an economic evaluation involving the cost-benefit analysis of Open Air Gyms installed in National Capital Region of India.

Under the qualitative assessment, semi-structured in-depth interviews were conducted with forty users of OAGs, ten non-users, four healthcare service providers and two OAG implementing authorities of Gurugram and Delhi. A thematic content analysis was performed for analyzing the responses of the study participants. The major benefits perceived by the OAG users and providers were health benefits in terms of improving fitness levels, reducing and maintaining weight, and diversifying exercise routines. In addition to improving physical health, OAGs were also considered beneficial by being a means of socialization amongst community members and also being affordable, easily accessible, and acting as a point of attraction for park visitors. The participants were also satisfied with the quality of equipment

provided and acknowledged that OAG equipment as safe to use by people of all ages. Constructive suggestions were given by the participants for improving OAGs further such as increasing the number of equipment installed, regularly maintain and timely manage faulty equipment, have lighting around the OAG area, improve user instructions on the equipment, and supervision of OAG users by onsite trainers. Under the cost-benefit analysis performed as the second part of this study, the human capital approach was adopted to estimate the benefits. Disability Adjusted Life Years (DALYs) attributable to physical inactivity in Delhi state were determined for each year from 2018 to 2028 for Delhi's population. These years were considered as the healthy life years that would be gained through the intervention of OAGs over the ten-year period. The monetary values of these healthy years gained were then calculated by valuing the DALYs as a multiple of Net State Domestic Products (NSDP) for each year in consideration. The future estimates were discounted at 5 percent* (taken as base-case) and at 3 percent. The data pertaining to cost OAG implementation was obtained from government websites and interviews with the OAG implementing authorities in Delhi. Benefit-Cost Ratio (BCR) of 1.1 and 1.2 were obtained for the discount rates of 5 percent and 3 percent respectively when a maximum initial outlay value of installing OAGs was considered. When the current (2018) cost at which Delhi government installs OAGs was considered BCR values of 1.8 and 2.1 were obtained at 5 percent and 3 percent discount rates respectively.

In conclusion, from economical as well as OAG users' and providers' perspectives, the concept of Open Air Gyms is a viable option for promoting physical activity across India.

Key words: physical activity, outdoor gyms, built environment, benefit-cost ratio, disability adjusted life years, non-communicable diseases, gross domestic product

Introduction

J N Morris, regarded as the man who invented the field physical activity epidemiology, has described physical activity as the "best buy" in public health.[1,3] Physical activity is defined by the World Health Organization (WHO) as "any bodily movement produced by skeletal muscles that requires energy expenditure. It includes activities undertaken while working, playing, carrying out household chores, traveling, and engaging in recreational pursuits".[2] Decades of research in the fields of exercise physiology, public health, epidemiology, and behavioral sciences have established a substantial body of evidence, which signifies that physical activity is associated with a number of health and economic benefits.[3]

Increased cardiorespiratory and muscular fitness, prevention of risk factors of non-communicable diseases such as hypertension, overweight and obesity, improved bone health, delay in onset of dementia, improved functional health, ultimately leading to improved quality of life and longevity are some of the health benefits one can derive from remaining physically active.[4-11] Conversely, physical inactivity is greatly linked with an increased risk of many adverse health conditions, including major non-communicable diseases (NCDs) such as coronary heart diseases, stroke, diabetes, breast and colon cancer, depression and falling.[8-11]

Despite clarity in health benefits associated with physical activity, the prevalence of insufficient physical activity continues to rise in populations globally.[12] According to a recent report by WHO experts, published in the *Lancet Global Health,* the global age-standardized prevalence of insufficient physical activity in 2016 was 27.5 percent.[12] The *Global Burden of Disease Study 2016* on risk factors for morbidity and mortality[13], also states insufficient physical inactivity to be one of the leading risk factors for mortality, which claimed

approximately 1.4 million lives globally in 2016.[13] Therefore, it is quite evident that physical inactivity remains a global pandemic and promoting regular participation in physical activity, continues to be a challenge for the public health.[14]

Physical Inactivity and the Burden of NCDs in an Ageing India

Owing to its rapid social and economic development, India is witnessing a major epidemiological transition.[15] According to *India: Health of the Nation's States Report,*[15] the proportion of Disability Adjusted Life Years (DALYs) attributable to communicable diseases has declined substantially across all Indian states since 1990 and that due to non-communicable diseases is making majority contribution to the overall disease burden in terms of premature death and disability.[15] The proportion of all deaths due to NCDs in India increased from 37.9 percent in 1990 to 61.8 percent in 2016. [15] The proportion of DALYs attributable to Cancer, Cardiovascular diseases and Diabetes in 2016 in India were 5 percent, 14 percent, and 40 percent respectively.[16,17,18]

Furthermore, India is also undergoing a rapid demographical change.[19] With increasing life expectancy and declining fertility rates, the population of the elderly (those aged 60 years and above) has increased in recent years and the trend is likely to continue in the coming decades.[19] According to UNFPA, it is projected that the share of population aged 60 and above is likely to increase from 8 percent in 2015 to 19 percent in 2050.[19] The main cause of mortality and morbidity among Indian elderly are the non-communicable diseases and given their increasing rate of share in the nation's population, the burden of NCDs is further likely to increase.[18,19, 20]

As far as the levels of physical inactivity are concerned, India had the prevalence of insufficient physical activity at 34 percent in 2016, the highest in South Asia.[12]

The Economic Argument

According to a study, published in *The Lancet*, which assessed the economic burden of physical inactivity globally, the total health care cost attributable to physical inactivity in India in 2013 was INT $ 985348.[21] In the year 2013, the Indian households shared the maximum brunt of direct healthcare costs due to physical inactivity at 58.2 percent in the form of out-of-pocket payments, whereas, the public sector shared 32.2 percent of the direct cost, and the private sector suffered 9.6 percent of the direct cost to healthcare.[21]

Therefore, in addition to morbidity and premature mortality, insufficient physical activity is also responsible for a staggering amount of economic loss to India and efforts need to be continued and strengthened furthermore to promote regular physical activity across the nation.

Physical Activity and the Built Environment

The socio-ecological model for health behavior suggests that health behavior (such as that of uptake of and adherence to physical activity) is not limited to factors associated with individuals. Rather, it is a result of inter-relationships between individuals and their social and physical environment.[22,23] In accordance, growing body of literature addresses the importance of upgrading built environments or open green spaces, with an aim to promote physical activity in communities worldwide.[24-32] Marcus and Forsyth, through their research on physical activity, also have indicated that environmental designs and policies have the potential to reach a broader, more sustainable base of citizens, and positively influences public's level of physical activity significantly.[33]

Positive associations between park features and park-based physical activity have been demonstrated in research.[34] As parks are usually located in nearby community

neighborhoods, easily accessible and available at either free or low-cost to people, a considerable amount of research has recognized parks' importance as settings for promoting physical activity and encouraging healthy behavior.[35-40] Additionally, a recent systematic review by Hunter et al. indicated that the evidence is promising for combining environmental interventions in urban green spaces with physical activity programs.[34]

Outdoor fitness equipment (or outdoor gyms) installed in urban public parks is one of such environmental interventions, aimed at increasing public access to places for physical activity, which is becoming increasingly popular worldwide.[41,42]

Outdoor Gyms and Associated Benefits

An outdoor gym consists of a variety of weather-resistant exercise machines, which are modified configurations of conventional indoor gym equipment, requiring no power to operate and are located in open spaces (such as parks) for public use.[42, 43]

Parks installed with outdoor gym equipment can offer a number of benefits. Outdoor gyms allow free-of-cost access to a variety of exercises that may help one to challenge and develop his/her aerobic fitness, body balance, flexibility and most importantly muscular strength, which is an area of fitness that often receives less attention but remains important for reducing mortality risks.[42, 44] Studies claim that the use of outdoor gym equipment qualifies for moderate to vigorous intensity of physical activity.[43,45,46] Cohen et al., in their study assessing the impact of outdoor gym equipment use on physical activity levels, estimated that the use such gyms, increased the physical activity levels (measured by Metabolic Equivalents or METs), to 15 percent and 8 percent from a baseline in user follow-ups 1st and 2nd respectively.[45] WHO recommends that in order remain healthy, those aged 18 years and above, should engage in at least 150 minutes of moderate to vigorous intensity physical

activity in a week and in muscle strengthening exercises for at least 2 days in a week.[47] Therefore, regular use of these equipment can be beneficial in achieving these targets.

In addition to health benefits, research to date also suggests that introducing outdoor gyms in public parks can lead to increase in park use, attract new park visitors, promote social engagement, build a stronger sense of community and a stronger sense of community.[45,46,48-51]

Furthermore, outdoor gyms are cost-effective in terms of achieving health benefits as shown by Cohen et al. in their study, in which they estimated that on an average a park visitor's physical activity increased at cost of only 10.5 cents per metabolic equivalent gained.[45]

Study Rationale

Studies done on outdoor gyms in Australia, Canada, Hing Kong, Taiwan, China, Brazil, USA, and China, using different methodologies, have attempted to evaluate the impact of installing outdoor gyms in open spaces and all have demonstrated results in both qualitative and quantitative terms.[42]

In India, acknowledging the need and role of outdoor gyms promoting physical activity and a healthier lifestyle, many outdoor gyms (referred to as Outdoor Air Gyms in India) have been installed at multiple public parks across different cities over the past 5 years.[52-59]

However, despite the availability of Open Air Gyms (henceforth, referred to as OAGs) in public parks of many Indian cities, no research has been done on them in any context. Issues explored by researchers on outdoor gyms in other parts of the world such as users' perceptions and experiences associated with the use of the gym equipment, frequency of use,

design, and promotion of outdoor gyms, their impact on improving physical health, and cost-effectiveness, all remain unexplored in the Indian context.

This study aimed to understand the current scenario of OAGs in National Capital Region of India. This was in an effort to understand the exact nature of use of these facilities, the perceived health benefits achieved, perceived challenges/barriers to using, and OAG improvements that would encourage use; thereby providing better and detailed information regarding OAGs in India. This was attempted on the basis of qualitative information obtained from key stakeholders related to OAGs in India, such as those who are current users and non-users of OAGs, are involved in OAGs' implementation, and are providers of health care services, serving the communities where OAGs are installed.

Furthermore, a public health approach to reducing the burden of non-communicable diseases and promote a healthier lifestyle among a population, in general, demands to be examined through the lens of economic evaluation. Understanding the benefits and/or effectiveness against the potential expenditure to adopt OAGs across the cities and gradually throughout the nation would facilitate better planning and designing of public parks in India, incorporating OAGs and eventually contributing to improved park-based physical activities and subsequent health outcomes in the nation.

Study Aim and Objectives

The aim of this study was to analyze the viability of Open Air Gyms as an intervention for promoting physical activity levels in the National Capital Region of India and subsequently the rest of the nation. The study involved two parts: first part focused on understanding the users and providers perspectives on the role of OAGs in physical activity promotion and the

second part involved producing evidence from an economic viewpoint by calculating the benefits of OAGs as against the costs.

The evidence produced would support health strategies aiming to promote physical activity and healthy lifestyle behaviors amongst the Indians, as well as similar population groups across the globe.

The objectives of the study were:

- To describe the users' and providers' perspectives on Open Air Gyms installed in National Capital Region of India.
- To conduct the cost-benefit analysis of Open Air Gyms installed in National Capital Region of India.

The respective methodologies and results for each of the aforementioned objectives of the study are discussed in two separate sections below as Part I and Part II.

Part I: Perceptions of OAG Users and Providers

Methodology

Study Design

Qualitative research methods are appropriate for eliciting in-depth information that can help to better understand the perceptions, attitudes, and beliefs pertaining to an issue, within a given socio-cultural context.[61]

As this study, to the best of the researcher's knowledge, is the first of its kind in India to assess the perceptions of users as well as other key stakeholders relevant to Open Air Gyms in India, a qualitative study design, involving semi-structured in-depth interview technique, was considered appropriate and developed for this study.

Ethical Approval

The ethical clearance for this research study and its specific protocol was obtained from Institutional Review Board for Protection of Human Subjects of IIHMR University, Jaipur, India (IORG0007355). Annexure 7 includes Institutional Review Board Certificate.

The following subsections describe in detail how the qualitative assessment was carried out:

Data Collection

Study Areas

National Capital Region of India (henceforth referred to as NCR), refers to an inter-state, coordinated planning and development region centered around the National Capital Territory of Delhi.[62] Certain districts, from the states of Haryana, Rajasthan, Uttar Pradesh, that surround Delhi are included in it and collectively form the NCR region, including Delhi. Gurgaon district (renamed to Gurugram in 2016) of Haryana state is one of the districts included in the NCR region.[62,63]

In India, Open Air Gyms first came up in selected public parks of capital Delhi in the year 2014, with an aim to promote physical activity in the region.[64] Soon, Gurugram followed, launching OAGs in its select parks. Over the years, in response to growing demand for the OAGs among the citizens of Delhi and Gurugram, many OAGs have been installed in public

parks and proposals for installing more of such OAGs in both the regions have been made by their respective municipal authorities.[65,66]

Therefore, citing a considerably larger number of OAGs installed in Delhi and Gurugram than that in any other states of India and also their growing popularity, these two regions were selected for this study.

Study Parks

Parks with OAGs

In order to best ensure similarities between study parks and at the same time best capture a wider spectrum of OAG related information, a list of parks with OAGs installed in them was first requested and obtained from the respective municipal authorities of Delhi and Gurugram. Also, detailed information about based on parks' attributes in terms of sizes, locations, neighborhood demographics and socioeconomic status of the population served, was obtained from government sources available online.

After considering the aforementioned parks' attributes, a total of four public parks, two in Delhi and two in Gurugram, installed with OAGs were selected.

Park without an OAG

With an aim to assess the perceptions of non-users of OAGs, as well as their willingness to use the OAGs, a park not installed with OAG but having a high footfall of people, engaged in other physical activities such as jogging, walking, Yoga etc., was selected in Gurugram.

All the parks included in the study are surrounded by residential areas and cater to neighborhoods belonging to relatively higher socio-economic status. The population of some

pockets of disadvantaged suburbs are catered by all the study parks. Also, all the parks were directly accessible by road; had jogging tracks; had drinking water supply, toilets, and change facilities and a separate children's playground.

OAG Equipment Characteristics

The OAGs included in the study were installed by the respective municipal corporations in the year 2016. All the OAGs were located in grassed open areas, installed on an acrylic-synthetic (rubber) surface. The number and type of equipment varied in the OAGs of the two regions and the reason cited for this were that the sizes of the selected parks in Gurugram are different and also that the OAG equipment manufacturing companies supplying the OAG equipment were different for Delhi and Gurugram.

All the equipment in each of the OAGs had imprinted instructions on them, in English language, about how to use the equipment, also mentioning the muscle group targeted by the specific equipment type. All the equipment pieces, at the selected OAGs, are specifically designed to meet the exercise needs of a broader adult population, including older adults, appropriate for all fitness levels and are also manufactured in lines with strict global standards. This information was obtained from the websites of the respective OAG manufacturing companies. This information was further used to better explore the equipment characteristics of selected OAGs and categorizing the equipment into different types based on the type of physical activity they provide, as done by Lee et al. in their systematic review of Outdoor Gyms.[45]

Annexure 4 includes the photographs of each type of OAG equipment installed in the study parks.

Table 1 below summarizes and compares the characteristics of the selected parks and their respective OAGs.

Table 1: Profiles of Selected Parks and OAGs

Study Park and OAG Attributes	**Park 1** **Tau Devi Lal Bio-diversity Park, Sector 52, Gurugram**	**Park 2** **Citizen Park, Sector 15- II, Gurugram**	**Park 3** **District Park, Hauz Khas, New Delhi**	**Park 4** **District Park, Sector 23, Dwarka, New Delhi**	**Park 5** **Santa Monica Community Park, Sector 57, Gurugram**
I. Park Size (Acres)	53.74	24.12	99.97	32.28	1.3
II. OAG Targeted Users	Adults	Adults	Adults	Adults	Adults
III. No. of OAG equipment	15	12	14	14	0
IV. Type of Equipment[#]					
▪ Aerobic	✓	Not clear	✓	✓	-
▪ Muscle Strengthening	✓	✓	✓	✓	-
▪ Muscle Flexibility	✓	✓	✓	✓	-
▪ Balance	Not clear	✓	✓	✓	-

Data Sources: Delhi Park Survey 2016,[82] MCG Park List,[91] Grandslam Fitness official website (outdoor gym equipment manufacturing company) [81]

#Judged on the basis of equipment name, on-site equipment descriptions, and equipment description available on websites of the OAG equipment manufacturing companies.

Sampling Method

Citing the time and resource constraints, a purposive sampling method was adopted for this study.

Participants who could provide information relevant to the research objectives by virtue of being observed to be actively using the OAG when the researcher visited the respective parks to conduct the interviews and OAG users and non-users who indicated a willingness to be interviewed were approached.

A conscious effort was made to include participants of both genders proportionally and also belonging to different age groups to the best possible extent.

Sample Size

Users

A total of forty OAG users were interviewed in this study, with ten users from each of the four selected parks. In addition to them, 10 OAG non-users were also interviewed after being randomly selected at Park 5 that wasn't installed with OAG when this study was conducted.

Providers

Four healthcare service providers (with specialties relevant to the research focus) and two OAG implementing authority personnel, serving the same communities as of that catered by the selected parks in Gurugram, were selectively approached and interviewed.

After conducting a literature review, the medical specialties of Cardiology, Endocrinology (Diabetology), Orthopaedics, and Physiotherapy were found relevant to the study's research

focus. Based on this knowledge, healthcare specialists from each of the aforementioned disciplines were included in the study. The specialists provided services at a corporate hospital in Gurugram, which was cited maximum by the OAG users of Park 1 as the healthcare seeking facility in case of any injury occurred to them in the park.

Amongst the implementing authorities, the Executive Engineer (Horticulture) at Municipal Corporation of Gurugram, one of the lead authorities for OAG project in Gurugram and a member of Resident Welfare Association, responsible for the maintenance and upkeep of Park 2 in Gurugram were included.

Recruitment of Participants

Primarily, the participants were recruited based on their willingness, availability of time and compatibility with the inclusion criteria mentioned below.

The participants will be included in the study based on the following criteria:

Users:

1. Aged 18 years and above, and
2. Using the OAG in the study area for a minimum of 1- month duration and for at least 2 days a week or,

Providers:

3. Directly involved in the planning and implementation process of OAG in the concerned city/locality or,

4. Involved in the provision of health services, at a health facility, catering to the same population as that of the selected study area/park

Criteria 1 and 2 were set based on the WHO's Global Recommendations on Physical Activity for Health,[47] which suggest that those above the age of 18 years should engage in at least 150 minutes of moderate to vigorous aerobic physical activity in a week and should also undertake muscle-strengthening exercises (as that provided by OAGs), for at least 2 or more days in a week. WHO recommends majorly aerobic activities to be undertaken for those aged below 18 years.[47]

Data Collection Tools

In-depth interviews, in order to explore the perceptions of the major OAG stakeholders in Delhi and Gurugram, were conducted during the period of June 2018 to July 2018, using three sets of tools, specifically developed for this study.

Tool 1 (Annexure 1) was used to assess the perceptions of the users of OAGs in selected public parks through open-ended questions related to perceived health benefits, issues related to equipment use and suggestions for OAG improvement. Tool 2 (Annexure 2) was used to assess the perceptions of OAG non-users and included questions aimed at assessing the willingness of the non-users to use the OAG in the future. Tools 1 and 2 also included questions to gather information about the demographic profile, frequency of park and OAG use and the type of physical activities undertaken in the park. Finally, Tool 3 (Annexure 3) was used to interview the OAG implementing authorities and healthcare service providers.

While using Tool 3, questions relevant to the person being interviewed were only asked and the questions considered not relevant were omitted; for instance, additional questions related to the OAG equipment cost, maintenance and promotion strategies for the OAGs were not asked the healthcare service providers.

Colored photographs of the different equipment installed in OAGs in NCR, served as an additional tool (Tool 4, Annexure 4) and were used as prompts during interviews to help participants accurately identify the OAG equipment as and when required.

Study Procedure

The interviews of the OAG users and non-users were face-to-face and intercept in active parks and each interview lasted for about 15 to 20 minutes. The interviews were conducted during mornings as well as evenings, as the footfall of park users was the highest during these hours.

It was made clear beforehand to the participants that their participation in the study was voluntary and they would be required to devote their precious time to the study only when they considered their primary intended tasks and activities in the park as over. For conducting interviews of the implementing authorities and the health care service providers, a prior appointment was taken, and their interviews were conducted in their respective offices. The duration interviews of the authorities and the healthcare professionals ranged from 25 to 40 minutes.

Prior to conducting the interviews, the willing participants received initial verbal briefings regarding the purpose of the study, notification that the interviews would be audio-recorded,

and all personal demographic and behavioral information that they would share would remain confidential. Participants were then provided with the Participation Information Sheet (Annexure 5), which consists of detailed information about the study. After the participant went through the information sheet and agreed to participate in the study, informed consent was taken on a Consent Form (Annexure 6), approved by the Institutional Review Board, IIHMR University.

In addition to audio-recording the participants' responses, on-site written notes were taken to accumulate richer information from any observations and/or interactions with the participants.

Data Analysis

The audio recordings from the interviews were translated into transcripts manually. The transcripts were then reviewed several times in order to assure accuracy. The written notes, taken during the time of the interviews, served as a supplement to the transcripts and helped augment the authenticity of the data.

In order to better understand the perceptions of the participants regard to the OAGs and to represent the data in the form of participants' own narratives, the qualitative data obtained was examined through a phenomenological lens.[67,68] Thematic content analysis[90] was performed, in which transcripts were read several times and major keywords pertaining to interview questions were noted. This resulted in the emergence of a number of themes and subthemes over time. Osborne's suggestions[68], related to phenomenological research methodologies, were used throughout this process to establish the trustworthiness of themes and sub-themes. An attempt was made to describe the emerging themes and sub-themes using

the participants' own words, wherever possible, and the themes were supported by quoting the best responses.

The responses of some of the participants, whose interviews were conducted in the languages of Hindi and Haryanvi (local dialect of Haryana State), were translated into English transcripts by the researcher, who is fluent in all the three languages (English, Hindi, and Haryanvi).

Results

In the following sections, the characteristics of the study participants and the themes and subthemes that best represent the participants' perceptions about the OAGs are described.

Participants' quotes, in their own words, are organized with each of the themes that emerged during the data analysis process to further ensure trustworthiness and clear addressal of the study objectives. The anonymity of the participants is maintained by substituting the names of the participants with their respective park's number and the order in which their interview took place. For instance, a respondent from Park 1, whose interview was held at 4^{th} sequence order of all the interviews, received the pseudonym of 'P1R4', where the letter 'P' denotes the word 'Park' and 'R' denotes the word 'Respondent'. The participants' genders and ages are also stated with each selected quote.

The quotes of the OAG implementing authorities and the healthcare service providers are denoted as per the participants' respective designations.

Characteristics of OAG users and non-users

Out of a total of 40 OAG users interviewed, 23 were males and 17 were females. 5 of them belonged to the age group of 20 to 30 years, 6 belonged to the age group 31 to 40 years, 12 to the age group 41 to 50 years, 9 to 51 to 60 years age group, 3 aged between 61 and 70 years, 3 aged between 71 and 80 years, and 2 belonged to the senior most age group of 81 to 90 years, with the oldest participant being 87 years of age.

Amongst the 10 OAG non-users interviewed, 5 were female respondents and 5 were males, and they had different ages between 30 and 70 years.

Of the 40 OAG users interviewed, 25 percent indicated that they used the OAG daily in a week, 55 percent for approximately 5 times per week (mostly on weekdays), and 20 percent for two times per week (mostly weekends). The duration for which OAG equipment was used by the participants ranged from a minimum of 30 minutes to a maximum of 1.5 hours. Nearly 78 percent of the respondents visit the park in the early morning hours and the rest visit the park either in the mornings or evenings depending on their daily schedule. All the participants, in addition to using the OAGs, carried out other activities in the parks such as walking, jogging, Yoga, and meditation.

Findings

The following sections describe the perceptions of the key stakeholders of OAGs from the selected study parks of Delhi and Gurugram.

Users' Perspectives

Perceptions and Experiences of OAG users

The perceptions of the study participants who are regular users of OAGs are grouped into three major groups: perceived benefits, experiences with OAG equipment, and suggestions for OAG improvement. The subsequent sections describe the perceptions of the OAG users in detail, with each sub-theme supported by respective respondents' quotations.

Perceived Benefits

When the participants were asked open-ended questions about their perceived benefits associated with the use of OAGs, all believed that the OAG equipment was beneficial for them in one form or the other and the following themes emerged:

Perceived Benefit 1: Improvement in Health

All of the participants believed that the regular use of OAG equipment helps them maintain and improve their **overall physical fitness** levels:

I have been using the gym for the last 3 months. Since then I am feeling fit, healthy, and I remain active throughout the day. (P3R5, Male, 45 years)

This gym is great for building the strength of the muscles. It targets the whole body if one uses all the machines here properly. So I think it's a great thing for overall fitness. (P2R4, Male, 42 years)

I feel more active and healthy now. Earlier I used to only walk, but now I also use this gym, and this makes the workout more interesting and motivational for me. (P4R3, Female, 37 years)

Most of the participants considered that the use of OAGs **adds diversity to exercise routines,** helping them exercise their body in ways and techniques they can't achieve by doing other activities in the park:

I think it's really beneficial, as exercises for the whole body are here in this gym. And running doesn't develop your muscles, it increases stamina, but weight training is also important to improve fitness and lose weight. So I think the gym is great for overall fitness. (P1R6, Male, 39 years)

It helps people with stretching exercises as these are many stretching machines available here. So, it has physical benefits, as stretching is very much important before and after any other exercises that we do in the park. (P1R1, Male, 28 years)

I think that while walking and jogging here in the park only the lower body workout is done and using this gym works out the upper body as well. So, I consider it great for overall/full body fitness. (P4R3, Female, 37 years)

Furthermore, many of the participants cited the use of the OAGs as beneficial in **reducing and maintaining their body weight**.

I have been using this gym for the last 8 months and I have lost about 10 kgs. Of course, I do brisk walking too, but I think walking combined with this gym, has helped me lose weight more. (P1R2, Male, 67 years)

I had both of my knees operated last year in January and after that, the doctor told me to exercise regularly and reduce weight. After the gym started here last year, I began using it. I have lost weight since then and my knees are also better now. (P1R5, Female, 73 years)

I reduced approximately 12 kgs. weight in the last 3 months with the help of this equipment as well. Earlier I used to jog or walk, but since I began using this gym, I lost weight quite rapidly. (P2R6, Male, 39 years)

I want to maintain my weight. If I exercise regularly I feel better. If I don't I tend to gain weight, so to keep my weight under control I come here. (P3R8, Female, 33 years)

I think it's great for weight loss and muscle toning, I have seen a lot of people here especially ladies who use this gym regularly and have lost a lot of weight over the time. (P4R3, Female, 37 years)

Perceived Benefit 2: Availability of OAGs within parks, in an open green environment, and without any time restrictions for use

Most of the OAG users, in addition to the perceived health benefits stated above, felt that as the OAGs are available **within the premises of the parks**, they had a one-stop destination for doing all of their physical activities.

What I think is the greatest benefit of this gym is that it is situated here in the park itself. People don't have to go anywhere else. People just walk, run, or complete any other activity as the warmup, then they come here, so there's no need to especially join a (commercial) gym. (P4R8, Male, 52 years)

After this gym has come up, I devote more of my time here. I feel it's far better than the paid (commercial) gyms as it is within the park and I can do it directly after I complete my walking and don't have to go anywhere else. (P2R1, Female, 58 years)

Many of the users also stated that by the virtue of the OAGs being installed in an **open green space,** they felt better during and after using the OAG equipment in terms of enhanced performance and feeling of freshness

When you perform the activities or exercises under the open air, the performance is better than in the closed gyms, that is the major benefit I think. (P1R1, Male, 28 years)

I find it better here because there is fresh oxygen in the air, my earlier gym was all enclosed, so the smell of sweat of so many people around would be there. I like it better here in the park, its fresh air and yes, no membership fee too. (P1R3, Female, 27 years)

Also, since this gym is out in the park, the workout is refreshing, unlike traditional/closed gyms which are usually cramped with equipment and a lot of people. (P4R3, Female, 37 years)

Some of the users also cited **no time restrictions** pertaining to the use of OAGs as a benefit.

Also, I was going to a paid gym for a few months, but I couldn't go there regularly because of my work schedule, but here I have time flexibility, I can come around the evening and the morning. And it is not that cumbersome, like in the paid gym, the equipment is restricted, if you go there in the evening there will be a lot of people, there is less space. (P1R1, Male, 28 years)

There is no time /day restriction here, due to my job profile, I am able to use the open gym on weekends/holidays/ at a time suitable to me. (P4R3, Female, 37 years)

I used to go to a paid gym near my house earlier, like 3 months back, but due to my study and college schedule I hardly used to take time out for the gym, but here in the park, I can come according to my convenience. I just come by my scooty here whenever I want to. (P1R3, Female, 27 years)

Perceived Benefit 3: A means of socializing and engaging with community members

Many of the participants, especially those aged 65 and above, visit their respective parks in order to interact and spend quality time with their friends. Some of them consider the OAGs as a social setting.

See earlier I used to do more of yoga, but yoga after a point gets boring. Sometimes I and my friends used to leave doing yoga mid-way as well. So now we have reduced our yoga time to 15 min minutes only and have devoted that time of 40 minutes to the gym here. Here we feel more energized and motivated to exercise, so we tend to spend more and more time here together. (P2R3, Male, 62 years)

Yes, I feel healthier and more active now. Also, I have a good time here with my friends, we talk and exercise simultaneously, so I really feel happy to come here. (P1R5, Female, 73 years)

Perceived Benefit 4: OAGs are affordable

I think the best thing is that it is safe for senior citizens to use, also I can't afford the gyms where a fee is to be given, so this gym is suitable for me, I feel lucky. I think the Haryana Government has taken a good step. (P1R4, Male, 63 years)

There are high charges of gyms especially in Delhi, so the free open gym facility is very lucrative and satisfying. (P4R3, Female, 37 years)

Perceived Benefit 5: OAGs are a point of attraction in the park

Some of the participants also reported that OAGs are the center of attraction for the park visitors:

Yes, definitely. I personally feel better after exercising here and I also see people coming here who used to before just walk or run, but now most everyone uses this open gym and it is a place of attraction for most of the people. They want to try new exercises and even if they don't exercise, they want to see it and show it to other people. (P3R10, Male, 38 years)

I think that this gym is a really good thing and because of this gym, the number of people coming to this park has increased a lot. I have been coming to this park for 7 years now and I have seen a great increase in the number of people coming here after the gym started one year back. (P2R3, Male, 62 years)

Experiences with OAG equipment

Three themes emerged after analyzing the responses to open-ended questions, designed to explore the users' experiences with OAG equipment specifically:

Experience 1: The number of OAG equipment is less

Nearly all the participants expressed their concerns related to the fact that there are a greater number of OAG users and a smaller number of equipment are available to meet the users' demands.

We have to wait for using the equipment. As you can see today is working day and still, so many people are here, so if the number of such machines is increased it will be good for all, the participation of people will increase. I think that some people are also even avoiding using this gym because it will take time for them to get a chance to use it. (P1R4, Male, 63 years)

A large number of people are using these machines and the equipment are less, so you have to wait for your turn. At some point your turn even may not come, that also happens. In the morning time there is more gathering, so such problem is there. (P1R7, Male, 46 years)

Due to less number of equipment and number of people there is a long waiting period. So, sometimes I have to cut short the routine or drop it altogether. (P4R3, Female, 37 years)

Experience 2: Quality of the equipment installed is good, however, maintenance services need to be improved

Majority of the OAG users were satisfied with the quality of equipment installed and reported that had never encountered any major mechanical issues while using the equipment.

Also, the machines here are good. Only one machine was having a problem, but the people from the company came a repaired it within a week. Touchwood, all machines are

good otherwise. You can see for yourself, the machines are being used starting from 4 a.m. in the morning till 9 p.m. in the night, all the seven days, still they are working well. (P2R3, Male, 62 years)

I have never had any problem using the machines. The machines are good. Only some of them make a squeaking sound when being used, as so many people use it. (P1R5, Female, 73 years)

I never encountered any problem with the equipment. There was some problem with the rowing machine but I don't know from where the maintenance people came, within 2 days it was repaired. (P1R6, Male, 39 years)

Some of the machines did become rough to use last month, but within 3-4 days of the problem, the company people came and repaired them. (P1R8, Female, 43 years)

I have never faced any problems using the gym, the machines are very simple and easy to use. (P3R6, Female, 67 years)

However, some of the users, though satisfied with the equipment quality, expressed concerns related to promptness of repair services of the equipment.

Yes, some of the machines have become rough and make squeaking sound and are not repaired till now. (P4R3, Female, 37 years)

Experience 3: Equipment is safe to use

All the participants reported no injuries when asked about if they had incurred any form of bodily harm while using any of the OAG equipment and considered the equipment safe to use.

No, I didn't get any injury, nor I have seen anybody getting any injury. They are very good machines and they are very useful for senior citizens especially. (P1R2, Male, 67 years)

No, I haven't had any injury using these machines. The machines are really safe to use. Even the elderly people are using them. (P1R8, Female, 43 years)

I think these machines are the best for senior citizens to use. I haven't heard any case till date that anyone felt a jerk while using these machines, the machines are really soft to use. I think these are really good for the senior citizens. (P2R3, Male, 62 years)

Users' suggestions for OAG improvement

The participants were asked to discuss ways to improve the OAGs in an open-ended manner. The following six themes evolved out of their responses:

Suggestion 1: Number of OAG equipment installed to be increased

I think somebody should do a study to see which machines are more used than the others and the concerned authorities should increase the number of those machines because sometimes people have to wait for more than 5 to 10 minutes. So I think authorities should talk to the people and find out which machines are most used. (P1R2, Male, 67 years)

I think more of such equipment should be put because many people have wait in queue for their turn. Also, more other types of equipment used for training the leg muscles can be put. (P1R3, Female, 27 years)

If the machines can be increased or a new set of machines can be installed in some other area, with separate timings for men and women, that will help reduce the number of people using the gym at a time. (P1R5, Female, 73 years)

There are two equipment I think for which another set can be added. Like there is this stationary bicycle and the other one is the rowing machine. Over these machines, people always arguing. So if someone can just come and get to know which machines are mostly used by people and then another set of these machines is added, it would be great. (P1R6, Male, 39 years)

The machines are really good. It's just that a lot of people are using them, especially the rowing machine, its everybody's favorite here. So if its number is increased to two here, people won't have to wait in ques. Even if we replace some of the machines here, like these benches for crunches, there are three of them here, so two of them can be replaced and another rowing machine can be put. (P2R3, Male, 62 years)

I would also like to say that even if another such gym is started in another area of this park, it is such a big park, the crowd will get distributed and it will be good for the public image of this park as well. Currently what happens is that many people, who are interested to exercise here, tend to leave on seeing the crowd and waiting lines. (P3R9, Female, 46 years)

Suggestion 2: Lighting around the OAG area

Also, as you can see it is late evening and the gym is not illuminated properly. There are ladies also here at night and there are senior citizens as well using the gym, so they may get hurt, fall down, so it should be properly illuminated. (P1R2, Male, 67 years)

Suggestion 3: Improved written instructions on the OAG equipment

These machines are here for two years now and as you can see yourself the instructions for using the machines have already faded. Though they are on a metallic plate, still the print has faded. I think the instructions can be permanently engraved. (P4R6, Male, 56 years)

The instructions here are in the English language. I don't know if the people coming here from nearby lower-class societies are able to understand them or they even want to read them. I feel if they can be in Hindi too, it would be good for all. (P3R8, Female, 33 years)

Suggestion 4: Regular maintenance and timely management of faulty equipment

I think that importance to the maintenance of the equipment should be given because in India importance to maintenance is not given generally. Right now the equipment is fine but as the time passes maintenance will be needed, if anything breaks it will be left as such, that I know, so maintenance should be there. Oiling of the machines will be required and if it's not done, the machines will break. So, there should be a separate budget for maintenance also. (P1R4, Male, 63 years)

One suggestion is that the mats here are torn at some places, so if these can be cleaned and a new one can be put it would be nice. Even the patches can be repaired, if not the entire mat. (P2R3, Male, 62 years)

Well, a mechanic should do the lubrication of these machines time to time. He shouldn't only come when anything breaks, he should be visiting on a regular basis. (P3R8, Female, 33 years)

Suggestion 5: Build a shed over the OAG

The gym is all the time open to the public and is out in the open. But it does not make much sense as during very hot or cold days or during monsoon, no one can use these facilities. So it would be good if at least a shed over the gym area can be put. (P3R10, Male, 38 years)

Suggestion 6: Ensure cleanliness of the OAG area

Also, since the gym is out in the open, a lot of leaves accumulate here. So daily cleanliness would be good. The park sweepers do clean it in the morning but later on, the leaves come again. So cleaning should be done regularly. (P2R3, Male, 62 years)

Some General Comments

I feel really proud when I see older ladies from rural background come to exercise. I have been seeing them since the inception of this gym and they are the most regular ones. I don't know if it is benefiting them physically much or not, but seeing them really interested

in the gym makes me feel really happy and proud, they are really active even at this age. All of them know me here and they all are like my mother. (P3R7, Male, 32 years)

Earlier I just used to walk or run. But when I saw this equipment for the first time, I thought someone has done some kind of charity but later on I got to know it's a government initiative, so I was surprised. I think it is really benefitting people here. I just want to say a big thanks to the people who installed this. (P2R9, Male, 26 years)

What I feel is that more of such gyms should come up and should be present in all the parks. My home is 3kms away from this park, so it's a bit far for me to come. There is an equally good park just in front of my home in sector 45, but I prefer to come here as this gym is here. (P2R1, Female, 58 years)

Table 2 summarizes the qualitative findings of OAG users' group in terms of perceptions explored by the researcher and the themes and sub-themes that emerged during content analysis.

Table 2: Major Qualitative Findings- OAG Users' Group

Perception Explored	**Theme**	**Sub-theme**
Perceived Benefits of OAGs	1. Health improvement	i. Improves physical fitness levels
		ii. Provides diverse physical exercise routines
		iii. Beneficial in reducing and maintaining bodyweight
	2. Accessibility	i. Convenient as situated within park premises
		ii. No times restrictions an advantage

	3. Affordability	No membership fee makes it accessible and affordable to everyone
	4. Outdoor location	Open space, green environment, and fresh air makes it more attractive and healthier
	5. Socialization	Means of socializing and engagement with community members
	6. Point of attraction in the park	Attracts more visitors to parks
Experiences with OAG Equipment	Quantity	Number of equipment installed is less, considering the high number of users
	Quality	Equipment installed are of good quality, but maintenance services can be improved
	Safety	Equipment is safe to use
Suggestions for Improvement		i. Increase the number of OAG equipment installed
		ii. Put lights the OAG area
		iii. Improve written instructions in terms of language and content on the OAG equipment
		iv. Regularly maintain and timely manage faulty equipment
		v. Build a shed over the OAG
		vi. Ensure cleanliness of the OAG area

Perceptions of OAG Non-users

The main objectives to interview participants from a park, which wasn't installed with an OAG (at the time when this study was conducted), were to know their perceptions about OAG related benefits, perceived barriers associated with OAG use, and their willingness to use an OAG. The subsequent sections describe the perceptions of the OAG non- users as well as their willingness to use OAGs in detail, with each sub-theme supported by respective respondents' quotations.

Perceived Benefits

Most of the participants considered OAGs beneficial in providing health benefits if used regularly.

Being a regular at the park for running and having a gym around will add variation to my workout routine, which I think will help me in weight reduction as well as muscle toning. (P5R3, Female, 26 years)

We all know that exercising improves our health, protects us from diseases. So, this gym would do the same. Full body exercise is necessary for a fit body, so with this gym, we will be able to exercise our upper body too. (P5R2, Male, 45 years)

Many also reported OAG being available inside the park premises and in the open environment is a great advantage.

I think the greatest thing about them is we wouldn't have to go anywhere else. We can complete our walk and then use the gym in the park itself. (P5R1, Female, 32 years)

The best part about it is easy to access and with open gyms, I can enjoy best of both, that is open and fresh environment as well as variation in my workout using the equipment. (P5R10, Female, 55 years)

Perceived Barriers

Many of the participants expressed their concerns about the general maintenance of the OAG equipment:

There is always a lack of general attitude of the public for responsibility towards public utilities, so I think regular maintenance or replacement will be always a challenge. (P5R2, Male, 45 years)

Some of the participants were also critical about the quality of OAG equipment. One of the participants said:

I am not sure how good this equipment will be, quality wise. Generally, all the things that government provide are of low quality, rarely it is seen that government is putting their money to get high-quality products. But I hope that this equipment is as per international standards. (P5R3, Female, 26 years)

For some, unsupervised use of OAG equipment was also a concern. As one of the participants reported:

See if one is using the gym equipment is a non-scientific manner or inappropriate ways, the person may get injured. So, if there is no supervision at this gym, it may cause health hazards rather than doing any benefit. (P5R2, Male, 45 years)

Willingness to use an OAG

A mixed response was received when the participants were assessed for their willingness to use an OAG. While some of the participants were quite fascinated by the OAG concept, few gave a neutral response.

Yes, I think that would be great because it will be convenient for us who come here to the park to walk, it's out in the open environment and is not like the commercial paid gyms which are indoors. (P5R1, Female, 32 years)

Yes, I would be definitely using it. We all know that going to the gym develops your body muscles and improves your stamina. So if a gym comes here, then why not! I would definitely use it. (P5R7, Male, 38 years)

I may or may not. It is hard for me to say at this point. I think the Open Gym will only work if proper maintenance is taken care off. If the exercise machines are broken, they would be of no use. (P5R2, Male, 45 years)

Table 3 summarizes the qualitative findings of OAG non- users' group in terms of perceptions explored by the researcher and the themes and sub-themes that emerged during content analysis.

Table 3: Major Qualitative Findings- OAG Non-Users Group

Perception Explored	**Theme**	**Sub-theme**
Perceived Benefits of OAGs	1. Health Improvement	i. Improves muscular strength and overall physical fitness levels
		ii. Adds diversity to physical exercise routines
		iii. Helpful in weight reduction
	2. Accessibility	Convenient as situated within park premises
	3. Location	Open space and open environment beneficial
Perceived Barriers	1. Equipment Quality	Quality of equipment as per best standards a concern
	2. Maintenance	Maintenance of equipment and upkeep of OAG area a concern
	3. User Safety	No supervision may lead to injuries

Providers' Perspectives

Perspectives of Healthcare Service Providers

The subsequent sections describe the perspectives of the healthcare service providers, serving the communities within the catchment area of Park 1, Gurugram, in detail. The quotes of the healthcare service providers are denoted as per their respective designations as follows:

D1: Endocrinologist

D2: Physiotherapist

D3: Cardiologist

D4: Orthopaedic Surgeon

Knowledge of Physical Activity Levels

When asked about their knowledge of current physical activity levels of people of NCR and its changing trends over the past decade, the medical specialists gave the following responses:

See, for the current physical activity level, I think, for younger population and young adults of around 18 to 40 years, only 20-30 percent would be physically active and going for running or doing strength exercises. But the majority of the people, say about 70 to 80 percent I would say are not exercising as per the recommended levels. More of the senior citizens, if I say, above the age of 60 years, they are doing more of physical exercises like yoga or walking because now they have retired from their jobs and have time for exercising. So, roughly I would say around 50-60 percent are physically active. (D1)

If we talk about the current physical activity level of people of Delhi NCR region, it is low in economically upper & upper middle class, moderate in lower middle class and considerably good in the lower class because of their occupation and the kind of work they do. (D4)

Some of the comments about noticing any change in physical activity trends over the past decade:

Although people are now more health conscious, they go to the parks more now and join gyms, there might be some increase in the physical activity level over the past 10 years, but I can't comment on that definitely because it can be only validated by a research study. But yes, definitely people are more health conscious now. (D1)

People are becoming more health conscious. For the last five years at least, I have seen this change. They are doing some kind of physical activity voluntarily and I consider it a good thing. (D3)

One of the reasons cited by the all the specialists for the changing physical activity trends was the promotion of healthy lifestyle behaviors, including physical activity, through mass media such as using television, radio, and print media (newspapers).

Some specialists also considered few of the government initiatives that promote the healthy lifestyle as being influential:

The Government is also now proactively pursuing 'well-being' of people. The healthcare and disease sector is a separate issue, but the government is also now stressing

on the well-being of its people. They are promoting Yoga etc. and also the Delhi and Haryana Govt. have also started the Open Gyms Project. So, the government is also taking an interest now in this area. (D3)

I think it's the growing awareness about sports and their associated health benefits throughout India as such. Also, events such as Rahgiri, where a healthy lifestyle is promoted, has brought this change. (D1)

Thoughts about the need and role of OAG

All the medical specialists acknowledged OAGs as being beneficial to the community. They cited several benefits associated with OAGs such as promoting physical activity amongst people of all ages and genders; providing health benefits such as improved muscular strength, weight reduction, control of blood pressure and blood glucose levels, and also improved bone health.

Other major benefits reported were OAGs being available at free-of-cost, providing the benefits of working out in an open environment, and time flexibility for use.

I think the concept of Open Gym is really good, especially for young adults, whom I think because of their working hours can't get enough exercise and are sedentary most of the time of the day. I get many young people who are diabetic, earlier it used to be people above 45-50 years of age who used to be diagnosed with diabetes, but now even the younger population is getting affected. So I think it will really benefit them. Also, for senior citizens who can devote more time to exercising, this concept is really good. Also, it is free of cost and the natural atmosphere is there which I think will benefit people more. (D1)

The people who cannot afford paid gyms, it's really good for them and for the housewives, who cannot go to the gym but are regularly going to the park. So if they are using these open gyms, I think it's a really good thing. I also think that with this concept of Open Gym, people will start coming out of the taboo and hitch that they face when people tell them "oh you are going to the gym", so with the open gym, I believe that this hitch will come out of the people. (D2)

I see it as a really beneficial thing because I think in Delhi-NCR region the main limitation that people face to exercise is the lack of space and time to exercise, so if you have such gyms in the parks, people can combine both cardio activities like jogging and cycling with going to the gym as well, they won't have to go separately to gyms to do weight training. (D3)

Perceived Challenges

All the medical specialists expressed their sentiments about the use of OAGs by people without under any exercise expert's supervision or guidance as a major concern.

As an orthopedic surgeon I think, someone to supervise the activity of the people should be there, as one may get injured if uses the machines incorrectly. (D4)

My only concern is that safety measures should be there, people should be guided to how to use the machines properly. If people are using the machines by themselves and are not doing it in a proper way, they might injure themselves, rather than benefiting from it. (D1)

Some of them also stated that proper maintenance of the OAG equipment would be a challenge:

I myself go to the gym on Saturdays and Sundays, so I can tell from the people's viewpoint. The number of equipment is less and the users are more, so in the time to come, a lot of people are using it, maintenance issues related to the equipment can arise. (D4)

Challenges would be maintenance. It won't come initially, it would come after a year or so, the equipment would require some service. So that would be the time to see how compatible this program will be. Otherwise, the program is good, if it can be managed and maintained well, there would be nothing like it.

Views about scaling up OAGs

All the medical specialists agreed to the idea of scaling up the OAG concept across other states of India, citing the reason that OAGs would help to promote physical activity across communities, improving the health of all:

I think it will definitely be beneficial. Healthier lifestyle should be promoted across all states and I see the Open Gyms as a good initiative for achieving it. (D2)

It's a really good step. It is free of cost, accessible to all sects of public and being an Outdoor activity compared to conventional gyms, it attracts and motivates people around. (D4)

Yes, definitely it should be scaled up across all the states of India. If not all the states at once, it can be scaled in cities or states which have the highest burden of non-communicable diseases. (D3)

Suggestions for Improvement

Suggestion 1: Supervision by a physical exercise expert/ gym trainer needed

All the medical specialists suggested the presence of a gym trainer:

If a trainer can come for 2-3 hours in the morning and in the evening and guide people to use the machines properly, it would be a better way to implement these Open Gyms. (D1)

As I said, putting just instructions on boards and that too in English is not enough. Availability of some expert on the site would be good, as the risk of injuries would be lowered then. (D4)

Suggestion 2: Promotion of OAGs necessary for encouraging larger participation

Getting 100 percent of the people to get active using this gym only will be a challenge. But yes, this will definitely improve the health of the people, but its success will also depend on the willpower of the people. People who are already coming to the park will use the gym and who have don't visit the parks as such will not use it. There will be an increase in the activity level of people but it will largely depend on the willpower and motivation of the people to use it. So efforts to promote these gyms and physical activity should also be there. (D1)

I think generating public awareness about the proper use of these machines should be done. These days all people are on social media, all have What's App on their phones. Why not use them to use to spread videos giving instructions about using these gyms? (D4)

Suggestion 3: Proper maintenance a must

Since these gyms are installed out in the open and also over a period of time they would require proper care and maintenance. So the municipal corporation should also focus on the maintenance part. (D1)

Suggestion 4: Install number of equipment as per population density of area catered

I would like to suggest that to increase in the numbers of this type of facility depending on the density of population catered. Some areas have a lot of users, so more equipment should be installed there. (D2)

Suggestion 5: Some equipment can be scientifically improved

I would say that a scientific manufacturing of the equipment should be done. As I have seen that some of the exercises people are doing are incorrect, the benches for crunches that I see are at an angle which can cause stress to lower back. So I think the opinion of physios and orthopedic surgeons should be taken while approving or manufacturing these machines. (D4)

Table 4 below summarizes the perspectives of healthcare service providers in the form of major themes explored by the researcher and the sub-themes that emerged from the responses.

Table 4: Summary of Perspectives of Healthcare Service Providers

Theme	Sub-theme
Physical inactivity level in NCR	Levels of physical inactivity in NCR are relatively higher amongst those in working age group of 15 to 64 years and those belonging to upper and upper-middle socio-economic classes
Perceived health benefits associated with OAG use	• Promotion physical activity amongst people of all ages and genders • Improved muscular strength • Weight reduction • Control of blood pressure • Control of blood glucose levels • Improved bone health
Perceived OAG Challenges	• User safety- improper use of equipment might cause injuries • Regular maintenance of OAG equipment
Suggestions for Improvement	• Supervision by a physical exercise expert/ gym trainer • Promotion of OAGs necessary for encouraging larger participation • Regular maintenance of equipment • Installation of equipment as per population density • Some equipment can be scientifically improved

Perspectives of Implementing Authorities

The responses from the interview with the Executive Engineer (Horticulture), Municipal Corporation of Gurugram (MCG), who is one of the lead authorities for implementing the OAGs in Gurugram, and responses of Resident Welfare Association (RWA) member, Park 2 Gurugram are organized as under the following themes and sub-themes.

The quotes of the implementing authorities are denoted as per their respective designations.

Knowledge of Physical Activity Levels

Both of the authorities stated that the majority of the people are physically inactive:

As far as the present scenario is concerned, I don't think the majority of the people are physically very active. As far as I am concerned, I have been observing and interacting with some people, they are only going for some walks, some go for jogging or some other physical exercises like Yoga in the mornings. And some people who can spend some money, they join gyms which are paid and have a time slot for exercise programs, for which they have to reach in that particular time slot only. (Exec. En. MCG)

On being asked about changing physical activity trends the responses were:

If I compare the activity level of people over the past ten years, the people are more active now, they are doing more exercises like yoga, running, walking etc. They are more active compared to previous years. (Exec. En. MCG)

I think that there is a great shift in the level of physical activity of people over the past 5 or ten years. Now people are more active and more health conscious as compared to the past, especially the adults. (RWA Member Park1)

The authorities reported the general park improvements and maintenance, as well as government initiatives to promote healthier lifestyles such as Rahgiris, were the factors promoting physical activity amongst people:

Over the years the number of parks has increased in Gurugram, the parks are maintained by the MCG and they attract a lot of people to exercise, the parks are beautiful and special tracks for jogging and walking have been made for people to exercise and they encourage people to exercise. Also, people have become more health conscious over the years, they have become more aware of the health problems and know that they can benefit from regular exercising. (Exec. En. MCG)

It's the people's realization with the time that their health is important and it is them who have to take care of their own bodies. And not to forget, there have been a lot of initiatives by the government as well over the years, like Rahgiris on Sundays, various sports events, then the parks have also drastically improved over these years. All these I consider have been really influential. (RWA Member Park1)

Thoughts about the need and role of OAG

So, the idea came to install such gyms in more parks so that people can use it without paying any money. Moreover, the persons who cannot afford the gym due to money problem or time problem, who cannot go to the paid gyms in a specific time slot, so they started using

Open Gyms more. Open Gyms are open to all public and free of cost. Without any discrimination, anyone can use it. (Exec. En. MCG)

I think it's a great concept and the need of the hour. The number of people that come to the parks nowadays is tremendous and having such open gyms available at no cost is a big thing. People use it in the mornings and the evenings and the footfall at the gym in our park is very high. People come not only from our sector but also from the adjoining residential areas as well. So, I think it's a great success and should be definitely scaled up. (RWA Member Park1)

Challenges related to OAG project implementation

The main challenge is that the people are really demanding, many of them want Open Gyms to be installed in their parks quickly. Currently, we have Open Gyms in 55 parks of Gurugram, we are expanding too, but people want us to be really quick, which practically isn't possible for us to do. This is the main challenge we are facing. (Exec. En. MCG)

My only concern is the quality, the quality of the equipment. No doubt, the equipment is good, but as many people are using it and as it's a bearing based machine system, it gets overused and becomes rough to use. (RWA Member Park1)

Also, as the footfall of users is very high and we have only one set of 12 equipment in our park, people don't get the chance to use and I think because of this reason many people, who want to use the gym, have to go their homes. (RWA Member Park1)

OAG Security

The following quotes by the Executive Engineer, MCG, describe in detail how the OAG equipment are theft and vandalization proof:

We haven't noticed anything like this like theft of the equipment etc. till now. We have given the responsibility for such things to concerned RWA because they are living in that particular area and they look after the issues related to OAG. People come to the park early in the morning around 5 am and remain till 11 am, so during this duration somebody from the neighborhood who is a member of RWA remains in the park too, so the chances of theft are very low.

*Moreover, the equipment is installed in such a manner that even 2 or 3 people together cant remove it from the ground because a block of CC (Cement Concrete) of 2*2*2 square feet area is inside the earth and the equipment is attached in it, so it is impossible for even a group of people to pull and dig it out. They will need a JCB machine or Hydra machine to remove it, so it is highly unlikely the equipment can be removed from its attachment.*

But vandalization can be done, somebody can come to hit and damage the equipment intentionally. But any such thing hasn't happened yet. Also, at many parks, there are security guards appointed by the RWA, so the security of OFE is maintained. (Exec. En. MCG)

Awareness of Community's Perceptions

Both the authorities were aware of perceptions of the users of OAG:

Yes, we are aware. The people are happy with the Open Gyms and they want more equipment to be installed. They are also demanding other different types of equipment that can be used for strengthening exercises. (Exec. En. MCG)

Yes, people here are loving it and I can say this for the whole of Gurugram city. The gym definitely motivates people here to move out of their houses, come to the park and improve their health. (RWA Member Park1)

Views about scaling up OAGs

Both of the authorities agreed to the idea of scaling up OAGs in other parts of the country as well:

Yes, definitely it will benefit a greater number of people. It will improve their health at no cost at all and they can use it as per their time suitability. (Exec. En. MCG)

I think it's a wonderful idea and definitely should be scaled up into other cities as physical health should be our top priority. No doubts about it. (RWA Member Park1)

Improvement Areas

Improving user instructions and meeting high demand of OAGs are on the minds of the implementing authorities:

One thing which I would like to do is to have instructions boards of equipment also mention people of which age group should do it and should have warning signs for people who might get an injury from using this equipment, like people with a back problem or knee problem etc. (Exec. En. MCG)

I think it's a really good thing and it should be definitely scaled up, keeping in mind the quality and demand of the gyms. (RWA Member Park1)

Table 5 below summarizes the perspectives of implementing authorities in the form of major themes explored by the researcher and the sub-themes that emerged from the responses.

Table 5: Summary of Perspectives of Implementing Authorities

Theme	**Sub-theme**
Benefits of OAGs	All types of gym equipment available free-of-cost, with all days accessibility, to all, and with added benefits of the open natural environment
Users' Profile	Majority of the users are women and the elderly
Challenges for OAG implementation	• High demand for OAG installations in parks having no OAG along within those already installed with an OAG set • A high number of users leading to equipment overuse
OAG equipment security	• Vandalization proof by virtue of being implanted 2 feet into the ground • Presence of an RWA member during OAG rush-hours for supervision • Weather-resistant material
Promotion of OAGs	• No active marketing is done. • Advertisement currently only through coverage in newspapers on the launch of new OAGs and through word-of-mouth amongst community members

Part II: Cost-Benefit Analysis of OAGs in Delhi

A desk study was conducted to do the cost-benefit analysis of installing OAGs in public parks of national capital Delhi. The data analysis was performed using Microsoft Excel- Version 16.15.

Methodology

Approach

Physical inactivity and its related diseases cost the society in multiple direct and indirect ways.[69,70,71] Indirect productivity costs to the society can occur in the forms of losses arising from temporary disability leading to work absenteeism, losses due to permanent disability resulting in reduced work hours and workforce departure, and losses due to premature mortality.[71,72]

Against this background, the Human Capital Approach (HCA) was adopted for estimating the lifetime productivity costs associated with physical inactivity in Delhi. HCA assumes that an individual, over the course of his/her lifetime, produces a stream of outputs and generates labor earnings, which add to his/her society's economy, reflecting the individual's productive capacity.[71,73-75] In other words, the productivity losses associated with morbidity and mortality due to an adverse health condition (in this case physical inactivity) are the market value of the contributions an individual would have made in future if s/he had continued to work in full health. [71,73-75]

Central to this approach was the assumption that through the of promotion of physical activity through OAGs in Delhi, the productivity losses that were likely to occur in future owing to physical inactivity burden in the state, would be prevented and considered as the benefits achieved in monetary terms. Further, assuming a class life of ten years for the OAG equipment, an intervention time period of 2018 to 2028 was considered for conducting the cost-benefit analysis.

Disability Adjusted Life Years (DALYs) were used as disease burden measure for physical inactivity in Delhi. One DALY represents one healthy life year lost and conversely, each DALY averted (as through OAG use in this case) represents a healthy life year gained.[76]

The DALYs attributable to physical inactivity were determined for each year from 2018 to 2028 for Delhi's population. These years were considered as the healthy life years that would be gained through the intervention of OAGs over the ten-year period. The monetary values of these healthy years gained were then calculated by valuing the DALYs as a multiple of Net State Domestic Products (NSDP) each year in consideration.

The monetary values are expressed in INR (2018 values) and future estimates were discounted at 5 percent* (taken as base- case) and at 3 percent*.

*Note: Discount rates taken as per WHO's recommended discounting rates range for conducting cost-effectiveness analysis in healthcare.[77] Additionally, a discounting rate of 5 percent was selected as the base rate as the average inflation rate in India in 2018 is approximately 5 percent.[78]

Analysis Assumptions

The following assumptions were made while conducting the cost-benefit analysis:

1. All physically inactive people of Delhi would use the OAGs and they would use it for durations as per WHO's recommendations for physical activity for health.[47]
2. The class life of OAG equipment is 10 years after which it would be fully depreciated.
3. All the public parks in Delhi would get installed with OAG during the zero-year 2018.
4. All the OAGs and public parks would be optimally maintained by the concerned municipal authorities, as per the required standards during the intervention period.
5. Environmental factors influencing physical activity, stated by WHO,[79] such as fear of violence and crime in outdoor areas, high-density traffic, and low air quality, would all remain constant.
6. Lifestyle behavior, such as consuming a balanced and nutrient-enriched diet, would prevail as a result of robust health programs and policies already effectively implemented.
7. *Annual growth rate of per capita Net State Domestic Product (NSDP) for Delhi is taken as 6.7%.
8. *Delhi's population growth rate is taken as 2.12%.
9. *Delhi's work participation rate will grow at an annual rate of 0.46%.

10. Assumptions considered in Global Burden of Disease Study 2016 and its related publications also apply to this study.[80]
11. Assumptions pertaining to Human Capital Approach also apply to this study.[71,75]

*Note: Calculations performed to estimate the growth rate described in detail in subsequent sections

Data Source

The Global Burden of Disease (GBD) Study 2016 series [80,12,13,15-18,21] used to collect data pertaining to Delhi state level Disability Adjusted Life Years (DALYs) attributable to various adverse health conditions as well as major risk factors responsible for morbidity and mortality. Data from India state wise Census reports of 2001 and 2011 was used for making various population projections and economic projections such as the work participation rate.

The data required for necessary economic calculations were obtained primary Government data sources, such as the reports of Economic Surveys of various years made available online by the Directorate of Economics Statistics (Delhi) and Central Statistical Organization. Information related to cost of OAG equipment shared by the Government officials of Delhi Development Authority (DDA) and the cost quotations provided by OAG equipment installing companies in Delhi state were instrumental in conducting the cost-benefit analysis as well.

Calculation of Benefits and Costs

Costs

The following steps were followed to calculate the costs related to purchasing, installing, and maintaining Open Air Gyms in Delhi:

Step 1: OAG Equipment Cost (Initial Outlay)

Data related to cost estimation of OAG equipment was derived from information available on Delhi Government's website, information shared by DDA officials and from quotations obtained from one of the major suppliers of OAG equipment in Delhi.

In the majority of the Delhi public parks on an average a set of 14 different types of OAG equipment are installed and there are approximately 14772 public parks in Delhi as per the latest park survey.[82] On an average, to install one OAG of 14 equipment types, an amount of INR 6,00,000 (2018 prices) is currently being paid by the Delhi government to outdoor gym equipment manufacturing/supplying companies. This amount covers discounted sales prices of a 14 equipment pieces OAG set, also excluding Goods and Services Tax (GST) of 18 percent.

However, for the purpose of this study, the maximum cost of installing OAGs was incorporated, considering sales of OAG equipment occur at Maximum Retail Prices, without any discount and include GST of 18 percent as well. This maximum initial outlay was

calculated to be INR 10,09,000 per OAG, which covered the cost of 14 equipment pieces and freight and installation charges.

Taking this amount as cost per OAG, the net initial outlay, taken as the cost of installing OAGs in all 14772 parks on Delhi was then calculated. Table 2 below presents the equipment-wise breakdown of cost calculation for the maximum initial outlay value.

Table 6: Equipment-wise Maximum Initial Outlay Breakdown

S. No.	**Equipment Name**	**Price*** **(including GST 18%, INR)**
1	Arm Wheel	60,000
2	Sit Up Station	60,000
3	Rowing Machine	73,000
4	Double Cross Walker	90,000
5	Horse Rider Station	57,000
6	Seated Chest Press	99,500
7	Pull Chair	99,500
8	Leg Press and Exercising Bars Combination	8,000
9	Stair Stepper and Twister Combination	60,000
10	Exercising Bars	55,000
11	Air Walker	60,000
12	Triple Twister	67,000
13	Leg Press Machine	80,000
14	Elliptical Exerciser	80,000
15	Acrylic Synthetic Sports Flooring	30,000
16	Freight & Installation Charges	30,000
	Total Amount Per OAG	**10,09,000**
	Total Number of Parks in Delhi	**14,772****
	Grand Total	14,90,49,48,000
	Maximum Initial Outlay Value	**14,90,49,48,000**

Data Sources:

*Grandslam Fitness official website (outdoor gym equipment manufacturing company). [81]

**Park Survey of Delhi 2016.[82]

Results, however, are also presented for the initial outlay value for all OAGs in Delhi at the current cost of INR 6,00,000 per OAG, in the 'Results' section separately. The initial outlay value for all 14772 parks, when the current cost of INR 6,00,000 per OAG was considered, was calculated as INR 8863200000.

Step 2: Maintenance Cost

Maintenance cost of OAG equipment was calculated at 10 percent for the year 2018. Projections of maintenance cost for each subsequent year were made by 2 percent additional cost as compared the cost of the previous year. This calculation was done based on the financial information shared by one of the OAG implementing authorities at Delhi Development Authority (DDA).

Benefits

For assessing the benefits, the following steps were followed:

Step 3: Delhi's population projections

India State Level Census 2001[83] and 2011[84] data was used for making the required population projections for Delhi. Delhi's population grew at the rate of 2.12 percent per annum during

the period 2001-2011.[83,84] Using the same annual population growth rate of 2.12 percent, total population projections were made from the year 2011 to 2028, starting with the 2011 Delhi population of 16787941.[84] Values for the period from 2018 to 2028 were used for further calculations.

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Step 4: Estimation of DALYs attributable to physical inactivity

Data about the total number DALYs attributable to the major risk factors were obtained from *India Health of the Nation's States Report*.[15] The DALY rate (DALYs per lakh population) attributable to physical inactivity in Delhi was 244 in the year 2016, according to the report.[15] This translates to 0.24 percent DALYs attributable to physical inactivity per person.

Keeping this percent value constant, the total number of DALYs attributable to physical inactivity were calculated by multiplying the total population of each year from 2016 to 2028 with the DALY rate of 0.24 percent.

Step 5: Delhi Work Participation Rate projections

According to Census 2011, the work participation rate of Delhi was 33 percent.[86] As per Census 2001 and 2011, the rate had an average growth of 0.46 percent annually during 2001 to 2011.[86] This growth rate was used to project the work participation rates from 2011 to 2028. The rates of 2018 to 2028 were then used for calculation purposes.

Step 6: Delhi per capita Net State Domestic Product (NSDP) projections

Data for estimating per capita NSDP for Delhi state was retrieved from Planning Commission of India website.[87] An annual per capita NSPD growth of 6.7 percent, at constant 2004-2005 prices, was calculated for the thirteen-year period of 2001 to 2014.[87] Keeping 6.7 percent of annual growth as constant, per capita NSDP projections were made for the period 2015 to 2028, starting with 2015 Delhi per capita NSDP (at constant prices) value of INR 1,27,667.

Step 7: Calculation of Value of Statistical Life (VSL)

The VSL for each year from 2018 to 2028 was calculated by multiplying the per capita NSDP of each year with a fixed labor income share of Gross Domestic Product (GDP) value of 49 percent (national value taken from PENN World Tables Version 9).[88] The 49 percent value of labor income share of GDP was kept constant for all the years in consideration.

Step 8: Calculation of Value per Disability Adjusted Life Year

Value per DALY for years 2018 to 2028 was calculated by multiplying the number of DALYs attributable to physical inactivity of each year with its respected work participation rates.

Step 9: Value of DALY to NSDP cap ratio

Value of DALY to NSDP cap ratio was calculated for each year by multiplying VSLs of each year from 2018 to 2028 with their respective values per DALY.

Step 10: Maintenance Cost deductions

Subsequently, maintenance cost for each year was then deducted from the value of DALY to NSDP cap ratio of respective years from 2018 to 2028.

The values obtained after the deductions were taken as the annual cash flows for respective years and were further used to calculate the total cash flow value and the net present value of installing OAGs in Delhi.

Step 11: Estimation of Total Cashflow Value of OAGs in Delhi

Cashflow values derived from Step 10 for years 2019 to 2028 were included to estimate the Total Cashflow Value. The year 2018 was considered as the zero- year, during which OAGs would be installed in all 14772 parks of Delhi. The net cost of OAGs derived from step 1 was entered as a negative value for the zero-year 2018, as its cash flow.

Further, time value of money (TVM) was taken into consideration and the cash flows of each year from 2019 to 2028 were discounted at the base interest rate of 5 percent to obtain the discounted cash flow values for respective years. This was done by multiplying the annual

cashflows with Present Value Factors (of a lump sum of Re 1), obtained from the TVM Present Value table,[89] taken at the base interest rate of 5 percent. Similarly, discounted values were also calculated at a rate of 3 percent.

Finally, the summation of discounted cash flow values from the year 2019 to 2028, for both the discount rates of 5 percent and 3 percent respectively, gave the Total Cashflow Value of monetary benefits received from installing OAGs installed in all the parks of Delhi.

Step 12: Determining the Net Present Value (NPV)

The NPV was obtained by subtracting the net initial outlay value (obtained from Step 1 calculation) from the total cash flow value (obtained from Step 11).

Benefit-Cost Ratio (BCR) and Benefit Per Park Calculations

The BCR was calculated by dividing the Net Present Value (obtained from Step 12) by the initial outlay cost of installing OAGs in all the 14772 parks of Delhi.

Furthermore, the benefit associated per park in Delhi was also determined by dividing the total cash flow value (obtained from Step 11) by the total number of parks in Delhi.

Results

I. Results at Maximum Initial Outlay Value

The results, when an OAG is installed at a maximum cost of INR 10,09,000 are presented in Table 3 below.

For a discount rate of 5 percent, the BCR is 1.1; in other words, for every rupee spent on installing OAGs in Delhi, the present value of the net economic benefit is 1.1 rupees. Also, the average benefits yielded by one park installed with an OAG is INR 85,528.

For a discount rate of 3 percent, the BCR is 1.2; meaning thereby, that every rupee spent on OAGs in Delhi, yields an economic benefit of 1.2 rupees. And the average benefit obtained by a park installed with an OAG is INR 2,42,757.

Table 7: Results at Maximum Initial Outlay Value

Discount Rate	Total Cashflow (INR)	Cost (INR)	BCR	NPV (INR)	Average Benefit per park (INR)
5% (base case)	16168365915	14904948000	1.1	1263417915	85,528
3%	18490955414	14904948000	1.2	3586007414	2,42,757

Details of each of the calculation steps leading to the final results are provided in Annexures 8 and 9.

II. Results at Current Initial Outlay Value

The results, when an OAG is installed at the cost of INR 6,00,000 (amount currently paid by Delhi government per OAG) are presented in Table 4 below.

For a discount rate of 5 percent, the BCR is 1.8; which means, that for every rupee spent on installing OAGs in Delhi, the present value of the net economic benefit is 1.8 rupees. The average benefit per OAG installed in a park at 5 percent discount rate is INR 4,95,051.

For 3 percent discount rate, the BCR is 2.1; which means, that every rupee spent, yields an economic benefit of 2.1 rupees. Also, the average benefit per OAG yielded at 3 percent discount rate is INR 6,52,348.

Table 8: Results at Current Initial Outlay Value

Discount Rate	**Total Cashflow (INR)**	**Cost (INR)**	**BCR**	**NPV (INR)**	**Benefit per park (INR)**
5% (base case)	16176098790	8863200000	1.8	7312898790	4,95,051
3%	18499691073	8863200000	2.1	9636491073	6,52,348

Details of each of the calculation steps leading to the final results are provided in Annexures 8 and 10.

Therefore, it is quite evident from the above results that installing OAGs in public parks of Delhi is economically beneficial. Profit is yielded even when maximum initial outlay value is considered and benefits are even higher when calculated at current initial outlay value.

Discussion

Outdoor Gyms installed in parks for public use are becoming increasingly popular as one of the built environment strategies to promote health-enhancing physical activity across multiple nations.[42] This is the first study in the Indian context which assessed the perceptions of the users and other key stakeholders of Open Air Gyms in India. This study also the first to objectively determine the economic benefits that might result from the potential reduction in the burden of insufficient physical activity through implementation and regular use of OAGs in India.

Perceptions about OAGs

The themes and subthemes that emerged from analyzing the responses of regular users of OAGs in NCR show that most of the users consider OAGs as beneficial in improving their health, by improving their overall physical fitness levels, reducing and maintaining their body weight, and providing exercising opportunities that target all aspects of human body. These results are in consistency with the study findings of Lee et al., who also state weight reduction, improved physical strength and general fitness as major perceived health benefits in their systematic review of outdoor gyms.[42] Additionally, the study's finding that OAGs in

NCR provide opportunities to users to target different aspects of physical fitness, aligns with the ideas of Aparicio,[92] who stated that the use of outdoor gyms involves all aspects of the human body, such as mobility, agility, strength, elasticity, balance, and coordination.

Besides the health benefits reported, OAG accessibility, affordability, outdoor location, attractive value and being a means of socialization were other major benefits perceived the OAG users. OAG accessibility in the form of gyms being situated within the premises of the parks along with no time restrictions provides a one-stop destination to all the park visitors with the added benefit of time flexibility. Additionally, the outdoor location of the gyms, offering the freshness and benefits of exercising in an open and green environment was stated as a benefit by many users. Moreover, the result in the form of self-reported observations by some of the OAG users, that OAGs add attractive value to the parks, suggests can lead to an increment in the number of park visitors. This aligns with the findings of studies done by of Cohen et al.[45] and Cranney et al.[46] who stated that installing outdoor gyms in parks can significantly increase the number of park visitors engaging in physical activities. The provision of OAG facilities at free-of-charge and opportunity to socialize with the community members are also acknowledged as a major benefit by the OAG users in NCR, both of which are also in congruence with the findings of the systematic review by Lee et al.[42]

Experiences with OAG Equipment

Nearly all the user participants included in this study reported the need for increasing the number of equipment installed in the OAGs, a finding which is in line with the results of

multiple studies on outdoor gyms in other parts of the world.[42] With high number of users and relatively lesser number of equipment available per user, especially during peak morning and evening hours, users either have to wait for long periods (which affects their intensity of workout), or they tend to exit the gyms. Some park visitors, having the desire to use the OAG equipment (as reported by some of the OAG users), do not even enter the OAG fearing long waiting periods and crowding.

Most of the OAG users are satisfied with the quality of equipment installed. However, some of the users of OAG also voiced their concerns about the promptness of the maintenance services. Those expressing this concern reported that, although repair of faulty equipment does take place, the duration of time taken by the concerned municipal authorities to take necessary corrective measures remains uncertain and variable. Furthermore, all the users interviewed, when asked about if they had sustained any form of injury while using the OAG equipment, reported no form of harm and expressed that the equipment is safe to use, even by the elderly.

Perspectives of other OAG stakeholders

This study, in addition to assessing the perceptions and experiences of users of OAG in NCR, went a step beyond to seek the opinions of non-users of OAGs, healthcare service providers from medical specialties considered relevant to the areas of physical activity and NCDs, and the OAG implementing authorities.

The need to understand the perspectives of the non-users of OAGs was considered important so that factors that might enable OAG usage and those that might act as barriers to entry could be highlighted. Most of the current non-users of OAGs, were willing to use OAGs, considering the health benefits and other non-health benefits such as easy accessibility due to gym location within park premises and the advantage of exercising in a natural open environment. However, many of those willing to use OAGs citing the aforementioned benefits, were also at the same time skeptical about the quality of OAG equipment that would be installed, regular maintenance and upkeep of the equipment, and users' safety owing to no supervision or training for correct use of OAG equipment being currently employed.

All the four healthcare service providers interviewed, acknowledged the need and role of OAGs in promoting physical activity and subsequently reducing of burden NCDs in NCR as well as other parts of the country. The major concern amongst all the specialists, from a medical perspective, was that no supervision or training by a physical exercise trainer/expert is being currently imparted and the incorrect technique of using the gym equipment might cause bodily harm to users, instead of benefiting them.

As per the implementation authorities interviewed, the demand for OAGs is very high in NCR. The OAGs are implemented according to the request of the community members, which is put forth by their respective RWAs during participatory budgeting meetings of the municipalities. This high demand for OAGs suggests that OAGs are able to meet the community's expectations. The implementing authorities also shared some vital information related demographic profile of the users of OAGs in Gurugram as well as Delhi. According to them, the majority of the users of OAGs in NCR region are women and the elderly (of both sexes). According to WHO's latest *Status Report on Physical Activity and Health in the South-East Asian region,*[93] women are more likely to be insufficiently physically active

than men in India, with the prevalence of physical inactivity being higher in females at 41.4 percent versus 21.4 percent prevalence in Indian men. Moreover, as the population of India ages, the threat of a further increase in the burden of NCDs prevails.[19] Therefore, the information on demographic profile of the users of OAGs, as shared by the OAG authorities, if considered reliable or even if it is further investigated and validated through research, can prove instrumental in viewing OAGs as a targeted intervention for promoting physical activity and healthy lifestyle amongst the females and the elderly, which could subsequently aid the efforts towards reducing the NCD burden in the nation.

Cost-benefit Analysis

The concept of Open Air Gyms is relatively new in India; hence, it was considered essential to understanding the associated benefits in monetary terms that might be yielded against the potential expenditure to adopt OAGs across cities.

It is estimated that a benefit of 1.1 rupees is yielded against every 1 rupee spent on installing OAGs in the parks of capital Delhi. Also, the benefit per park yielded is INR 85,528. These estimates resulted when a maximum investment cost is considered for installing OAGs in all current public parks of Delhi and that too at a discount rate of 5 percent. The economic benefits are higher when a discount of 3 percent is considered. However, if the current (2018) cost at which the Delhi government installs OAGs in the state is taken into consideration, the returns are even higher. Then, for every rupee spent on OAGs in Delhi, a benefit of 1.8 rupees is yielded, at the discount rate of 5 percent. Moreover, benefits per park increase to INR 4,95,051 when the current cost to Delhi government for installing an OAG is considered.

This economic analysis assumes that OAGs would be installed in all the 14772 parks of Delhi, however, in real time, installations in all the parks wouldn't be a necessity. This is supported by the idea that the catchment area of the park extends beyond the community where the park might be located. Furthermore, this analysis only considers the productivity loses associated with DALYs attributable to physical inactivity in Delhi. If the potential aversion of DALYs attributable to major NCDs is also taken into consideration, that might result from increased physical activity levels by the use of OAGs in Delhi, the returns would be even greater than the investments made in this sector.

Recommendations for OAG improvement

The qualitative findings of this study can have implications for maximizing the benefits and minimizing the drawbacks of OAGs in India. The perception, experiences, and suggestions shared by OAG users, non-users, and the healthcare service providers included as part of this study can prove to be fruitful for the urban planning professionals, local municipal authorities, as well as the OAG equipment manufacturers.

Table 7 below presents the summary of recommendations for improving the OAGs as shared by the participants included in this study. The recommendations are presented as the main theme, accompanied by sub-themes of possible solutions, which are respectively supported by quotations of respondents, stated below.

Table 9: Summary of Recommendations for OAG Improvement

Recommendations	Sub-themes and Supporting Quotations
An increment in the number of OAG equipment	**1. Installation of a new set of OAG equipment within the same park** *I would also like to say that even if another such gym is started in another area of this park, it is such a big park, the crowd will get distributed and it will be good for the public image of this park as well. Currently what happens is that many people, who are interested to exercise here, tend to leave on seeing the crowd and waiting lines. (P2R3)*
	2. Selectively increasing the number of most used equipment type, replacing with least used ones *The machines are really good. It's just that a lot of people are using them, especially the rowing machine, its everybody's favorite here. So if its number is increased to two here, people won't have to wait in ques. Even if we replace some of the machines here, like these benches for crunches, there are three of them here, so two of them can be replaced and another rowing machine can be put. (P2R3)*
Regular maintenance of equipment	*Well, a mechanic should do the lubrication of these machines time to time. He shouldn't only come when anything breaks, he should be visiting on a regular basis. (P3R8*

Lighting around the OAG area	*Also, as you can see it is late evening and the gym is not illuminated properly. There are ladies also here at night and there are senior citizens as well using the gym, so they may get hurt, fall down, so it should be properly illuminated. (P1R2)*
Improved written instructions on the OAG equipment	**1. Non-fading/weatherproof instructions on equipment** *These machines are here for 2 years now and as you can see yourself the instructions for using the machines have already faded. Though they are on a metallic plate, still the print has faded. I think the instructions can be permanently engraved. (P4R6)* **2. Instructions in the Hindi language** *The instructions here are in the English language. I don't know if the people coming here from nearby lower-class societies are able to understand them or they even want to read them. I feel if they can be in Hindi too, it would be good for all. (P3R8)*
A shade over the OAG area	*The gym is all the time open to the public and is out in the open. But it does not make much sense as during very hot or cold days no one can use these facilities. So it would be good if at least a shed over the gym area can be put. (P3R10)*
Cleanliness of the OAG area	*Also, since the gym is out in the open, a lot of leaves accumulate here. So daily cleanliness would be good. The park sweepers do clean it in the morning but later on, the leaves come again. So cleaning should be done regularly. (P2R3)*

Onsite Trainers	*My only concern is that safety measures should be there, people should be guided to how to use the machines properly. If people are using the machines by themselves and are not doing it in a proper way, they might injure themselves, rather than benefiting from it. So if a trainer can come for 2-3 hours in the morning and in the evening and guide people to use the machines properly, it would be a better way to implement these Open Gyms. (R2)*
Promotion of OAGs	*Getting 100 percent of the people to get active using this gym only will be a challenge. People who are already coming to the park will use the gym and who have don't visit the parks as such will not use it. So efforts to promote these gyms and physical activity should also be there. (R2)*
Installations to be as per population density of area catered	*I would like to suggest that to increase in the numbers of this type of facility depending on the density of population catered. Some areas have a lot of users, so more equipment should be installed there. (R3)*

User safety was a major concern that emerged amongst the healthcare service providers and non-users of OAGs included in this study and the presence of an onsite trainer is recommended. In Brazil, under the *Golden Age Gym program*[95], an outdoor gym project focusing on the elderly, the municipality has partnered with a health university, wherein the university provides students from Physical Education course to work in the gyms and perform activities with the older adults. The students are evaluated based on their contribution to the

project and also granted fellowships for their further career pursuits based on their participation in the project. Although hiring professional trainers at the OAGs in India can be the best buy to ensure user safety, a similar approach as that of Golden Age Gym program described above can be adopted in India as well.

The use of social media platforms such as Facebook and messenger applications such as What's App can be helpful in the promoting OAGs. User safety can further be ensured by using the aforementioned social mediums, wherein videos and infographics by physical exercise and health experts demonstrating correct use of equipment and cautions for use can be shared in the public domain.

The suggestion that a shed should be built over the OAG area, if implemented, might compromise the benefit of open space and fresh air associated with OAGs. Instead, plantation of trees around the OAG area can be undertaken by the respective municipalities to ensure the OAG remains under the shade of the trees.

It was also observed by the researcher during the interview sessions with the OAG users that there were no restrictions for children. Although the instruction boards in the study parks mentioned that children were not allowed to use OAGs, children were still observed to be using the equipment and interfering the exercising routines of the adults. The use of OAG equipment by children shouldn't be allowed as it's not suitable for them and might lead to injuries. The RWA must ensure that children do use the OAGs. A separate children's play area can also be established adjacent to the OAGs for this purpose.

Study Limitations

While attempts to enhance the scientific rigor of this study have been made at every possible step of the methodologies adopted, several limitations pertaining to the qualitative approach taken and the economic analysis done in the study exist.

Firstly, as purposive sampling technique was employed to recruit participants for the study, which is a deliberative and non-random approach.[94] Hence, this study might be prone to sampling and non-sampling errors.[94] Secondly, this study was confined to the geographical areas of Delhi and Gurugram, therefore, the qualitative findings of this study cannot be generalized for other regions because factors such as OAG accessibility, weather, location, the demographic profile of the community might influence the OAG use.

The cost-benefit analysis performed has several limitations to it as well, for which caution would be appropriated while interpreting the results. The data on the target population, economic indicators, and intervention costs were collected from different online sources, personal interviews with officials, and research studies. Efforts were made to keep the data comparable at every step, however, where recent updates weren't available, projections were made on existing figures. Also, the data on DALYs attributable to physical inactivity in Delhi for the intervention period were considered from GBD Study 2016. Hence, the projections made in this study may vary.

Conclusion

The worldwide trend of rising physical inactivity poses a great threat to the health of the people across all nations and the promotion of physical activity remains an important public health agenda.[3] Recognizing the strong linkage between physical inactivity and non-communicable diseases, all the WHO member states have aggreged to achieve 10 percent relative reduction in the prevalence of insufficient physical activity by the year 2025.[9] Furthermore, the *Global Action Plan on Physical Activity 2018-2030*[8] highlights that the achievement of twelve of the seventeen Sustainable Developmental Goals (SDGs), in addition to the third SDG of Good Health and Well-being, is greatly linked to promotion of physical activity. Hence, investment in policy and program actions that promote physical activity is indispensable for any country that is ambitious towards achieving the SDGs.

This study evaluated the potential role Open Air Gyms, installed in public parks, can play in the promotion of physical activity across India. Quantitative, as well as economic assessments of Open Air Gyms installed in public parks of two major areas of National Capital Region of India, were performed under this study.

According to the results of this study, OAGs have the potential to meet the health demands of the public at large, as the OAG users, as well as providers, believe that the use of OAGs contributes to their perceptions of promoting physical, mental, and social well-being. Moreover, some of the challenges associated with OAG use, as highlighted in this study, if mitigated, can result in a higher participation of the community members in this park-based intervention. Furthermore, from an economic perspective, the returns on investment for OAGs are multifold. As per the cost-benefit analysis performed in this study, profits were yielded even when the highest cost of installation for OAGs was considered. Therefore, from

economical as well as OAG users' and providers' perspectives, the concept of Open Air Gyms is a viable option for promoting physical activity across India.

In conclusion, this study contributes to the first empirical evidence on outdoor gyms in India. Creating active environments is one of the strategies that a nation must adopt for promoting physical activity (as outlined in the *Global Action Plan on Physical Activity 2018-2030*[8]) and the findings of this study offer vital information for the development and health authorities committed to ensuring effective use of open green spaces such as parks in order to meet the active recreational needs of an increasing and aging Indian population, which also risks bearing the brunt of non-communicable diseases.

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Annexures

Annexure 1: Semi-structured interview guide- Tool 1

Questions to be asked to the users of Open Air Gym in the selected public park:

1. How often have you visited the park in a week in the past 1 month?
2. What physical activities do you usually do when visiting the park?
3. Why do you want to use this outdoor fitness equipment in the park?
4. When do you come to use these facilities during the day (morning, afternoon?)
5. For how much duration do you use these facilities typically?
6. Prior to installation of the Open Air Gym, what kind of exercises you would generally do and for how much duration?
7. In your opinion, what is the benefit of using these facilities?
8. Do you encounter any problems or injury in using these facilities? Please describe, if any.
9. Do you have provision and access to health facilities if any injury incurs to you or other users while using this equipment?
10. Do you have any recommendation for these facilities such as locations or equipment types?
11. In terms of your physical activity level, do you perceive any changes in physical activity level after the installation of the fitness equipment?
12. Any other suggestions or ideas you would like to express?

Annexure 2: Semi-structured interview guide- Tool 2

Questions to be asked to the non- users of Open Air Gym in the selected public park:

1. What physical activities do you usually do to keep yourself healthy? And for how much duration for each?
2. Are you aware about the Open Air Gyms? (If not, introduce it to them with the show of photograph)
3. What according to you could be the benefits of such Open Air Gyms? (Such as free of cost, out in the open, and all days/all the time open)
4. What according to you would be the challenges associated with such gyms? (Such as maintenance, injuries)
5. If such an Open Air Gym comes up in a public park near you, will you be willing to use it? Please give reasons for your answer.

Annexure 3: Semi-structured interview guide- Tool 3

Questions to be asked to the implementing authorities responsible for installing Open Air Gym in selected public park and healthcare service providers serving the same community:

1. How do you perceive the current physical activity level of the people of the community you serve?
2. As per your opinion, how has the level of physical activity of people has changed over the past decade?
3. What measures you consider have influenced this change?
4. What are the types of OAG equipment being installed in parks? Are there any standard specifications followed for the equipment? If yes, which ones?
5. How do you perceive the need and role of OAGs in promoting physical activity and improving the health of people of your city?
6. What challenges do you consider are important while implementing OAGs in public parks?
7. How do you think these challenges can be mitigated?
8. Are you aware of the perceptions of the users of OAGs in your community?
9. If the OFE projects were to be to introduce as a health intervention under a national health policy or a program, would you consider it beneficial or not? Give reasons.
10. Any other suggestions or ideas you would like to express?

Annexure 4: Photographs of each type of OAG equipment installed in study parks- Tool 4

(Source of Photographs: Clicked by the Researcher)

Equipment Name	Equipment Photograph
Air Walker	

Arm Wheel	
Double Cross Walker	

Elliptical Exerciser	
Exercising Bars	

Horse Rider	
Leg Press	

Pull Chair	
Rowing Machine	

Seated Chest Press	
Sit-up Station	

Stair Stepper and Twister	
Triple Twister	

Photographs of Open Air Gyms

OAG Photograph 1: Open Air Gym at Study Park 4, Delhi

OAG Photograph 2: Open Air Gym with Users, Study Park 1, Gurugram

OAG Photograph 3: Open Air Gym with Users, Study Park 1, Gurugram

OAG Photograph 4: User Instructions on an OAG equipment, Study Park 1, Gurugram

(**Instructions include:** technique of using the equipment, body functions targeted by the equipment, cautions to undertake, and warning for usage)

Annexure 5: Participation Information Sheet

Participant Information Sheet

Study title: Perception of Users and Cost-Benefit Analysis of Open Air Gyms in Public Parks of National Capital Region, India

Study location:

Ethics committee ref.: IORG0007355

Lead investigator: Dr. Rachit Sharma

Contact number: +91 9145992982

You are invited to take part in a study on assessing the current situation of Open Air Gyms installed in public parks as a strategy to promote physical activity and healthy behavior in Indian communities. Whether or not you take part in this study is your choice. If you don't want to take part, you don't have to give a reason for non-participation. If you do want to take part now, but change your mind later, you can withdraw of the study at any time.

This Participant Information Sheet will help you decide if you'd like to take part. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have.

If you agree to take part in this study, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 6 pages long, including the Consent Form. Please make sure you have read and understood all the pages.

WHAT IS THE PURPOSE OF THE STUDY?

In India, with the aim of promoting physical activity and healthier lifestyle behaviour amongst people, much Open Air Gyms (OAGs) have been installed at multiple public parks

in different cities such as New Delhi, Gurugram, Jaipur, and Guwahati, over the past 5 years and many more are coming up in other cities.

Although, despite the availability of OAGs in public parks, no research has considered the user's perceptions of, and experiences with, using this equipment. Whether or not OAGs meet the needs of the target population group, the details surrounding its use remain unclear. Also, the perceptions of the OAG implementing authorities and healthcare service providers serving the target community, which play an equally important role in providing information on OAG use and its associated benefits, is not known.

Therefore, this study aims to understand the current scenario of OAGs in India, based on information obtained from documentary analysis and conducting qualitative semi-structured interviews of stakeholders who are current users of OAGs, are involved in implementing and installing this equipment, and the healthcare service providers serving the same community where OAG is installed. This is in an effort to understand the exact nature of use of these facilities, the perceived health benefits achieved, and equipment's improvements that would encourage its use; and thereby providing thereby providing better and detailed information regarding OAGs in India, which will contribute to better planning and designing of public parks in India, eventually contributing to improved park-based physical activities.

Ethical Approval

This study has obtained ethical to approval from the Institutional Review Board of IIHMR University, Jaipur, Rajasthan, for the research and its specific protocol.

WHAT WILL MY PARTICIPATION IN THE STUDY INVOLVE?

You have been chosen to participate in the study as you fulfill one or more of the following criteria:

1. You are aged 18 years and above, and
2. You have been using the OAG in the study area for a minimum of 1- month duration and for at least 4 days a week or,
3. You are directly involved in planning and implementation process of OAG in the concerned city/locality or,
4. You are involved in the provision of health services, at a health facility, catering the same population as that of the selected study area/park

In this study, we will be conducting an interview with you, in which we will be asking you a series of questions to understand your experience regarding OAG use, the health benefits that you perceive from them, and the improvements that you think can be made to further improve such facilities in parks.

The questionnaire consists of about 10 to 12 questions and the interview shall last not more than 30 to 40 minutes in duration.

Please Note: Your responses will be audio recorded

The discussion during this interview will be audio recorded to help the researcher accurately capture you insights in your own words for better analysis. The recording will only be heard by the researcher for th purpose of this study and no one outside the research team will be allowed access to the original recordin

Your anonymised data will be kept for future research purposes related to this study such as publicatio in scientific journals. No other use will be made of the recording without your written permission.

If you feel uncomfortable with the recorder, you may ask that it be turned off at any time.

WHAT ARE THE POSSIBLE BENEFITS AND RISKS OF THIS STUDY?

As this study will be the first in India to document the perceptions of users, implementing authorities, and healthcare service providers, regarding OAG use and its perceived benefits, it will provide greater insight for contributing to better planning and designing of public parks in order to promote park-based physical activity among Indian communities.

The risks and discomforts associated with this study are negligible. As some of the questions asked in the interview will be based on the health behavior of the participant, minimalistic psychosocial stress may be caused.

WHO PAYS FOR THE STUDY?

For participating in the study, the participants will NOT incur any costs.

WHAT ARE MY RIGHTS?

1. Participation in this study is voluntary. Participants are free to decline to participate or to withdraw from the research at any practicable time, without experiencing any disadvantage.
2. Participants have the right to access information about them collected as part of the study.
3. Participants will be told of any new information about adverse or beneficial effects related to the study that becomes available during the study that may have an impact on their health.
4. Participant's all data, with respect to both demographic information and behavioral information will remain confidential. No material, which could identify the participant personally, will be used in any reports on this study.

WHO DO I CONTACT FOR MORE INFORMATION OR IF I HAVE CONCERNS?

If you have any questions, concerns or complaints about the study at any stage, you can contact:

Dr. Rachit Sharma
Master of Public Health candidate at IIHMR University, Jaipur, Rajasthan
Contact Number: +91 9145992982, +91 819902132
Email ID: drrachitsharma09@gmail.com

Annexure 6: Consent Form

Consent Form

Please tick to indicate your consent to the following:

I have read or it has been read to me in my first language, the Participant Information Sheet and I have understood it.	Yes ☐	No ☐
I have been given sufficient time to consider whether or not to participate in this study.	Yes ☐	No ☐
I am aware that my responses will be audio-recorded.	Yes ☐	No ☐
I am satisfied with the answers of the doubts I had regarding the study and I have a copy information sheet.	Yes ☐	No ☐
I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time.	Yes ☐	No ☐
I consent to the research staff collecting and processing my information, including information about my health.	Yes ☐	No ☐
If I decide to withdraw from the study, I am aware that the information collected about me will not be shared and processed.	Yes ☐	No ☐
I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.	Yes ☐	No ☐
I know who to contact if I have any questions about the study in general.	Yes ☐	No ☐
I understand my responsibilities as a study participant.	Yes ☐	No ☐
I understand that my anonymised data will be kept for future research purposes such as publications related to this study.	Yes ☐	No ☐

Declaration by participant:

I hereby consent to take part in this study.

Participant's name:

Designation:

Signature: Date:

Declaration by the member of the research team:

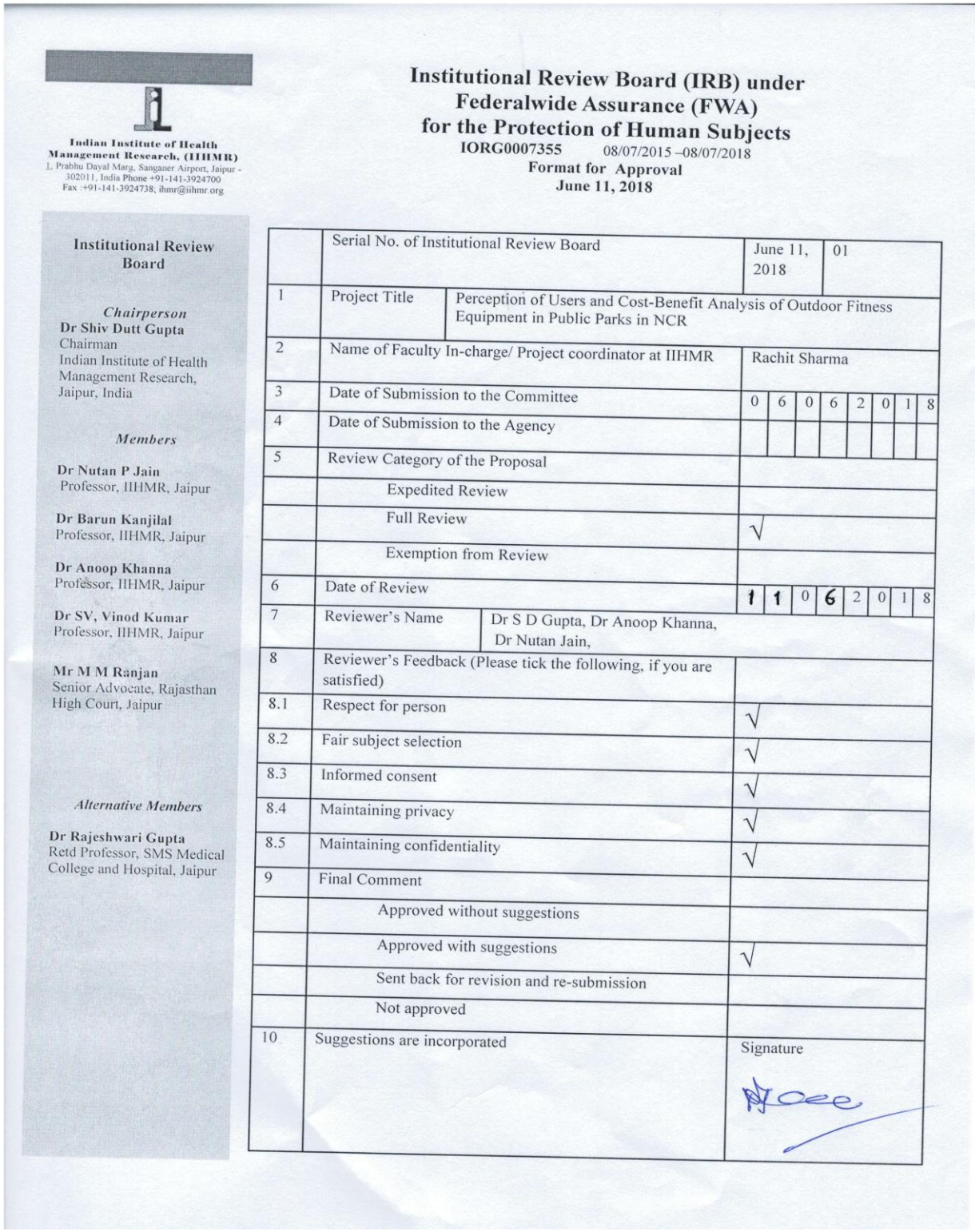
I have given a verbal explanation of the research project to the participant and have answered the participant's questions about it.

I believe that the participant understands the study and has given informed consent to participate.

Researcher's name: Dr. Rachit Sharma

Signature: Date:

Annexure 7: Institutional Review Board Certificate



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Institutional Review Board (IRB) under Federalwide Assurance (FWA) for the Protection of Human Subjects
IORG0007355 08/07/2015 –08/07/2018
Format for Approval
June 11, 2018

Institutional Review Board

Chairperson
Dr Shiv Dutt Gupta
Chairman
Indian Institute of Health Management Research, Jaipur, India

Members

Dr Nutan P Jain
Professor, IIHMR, Jaipur

Dr Barun Kanjilal
Professor, IIHMR, Jaipur

Dr Anoop Khanna
Professor, IIHMR, Jaipur

Dr SV, Vinod Kumar
Professor, IIHMR, Jaipur

Mr M M Ranjan
Senior Advocate, Rajasthan High Court, Jaipur

Alternative Members

Dr Rajeshwari Gupta
Retd Professor, SMS Medical College and Hospital, Jaipur

	Serial No. of Institutional Review Board	June 11, 2018 / 01
1	Project Title	Perception of Users and Cost-Benefit Analysis of Outdoor Fitness Equipment in Public Parks in NCR
2	Name of Faculty In-charge/ Project coordinator at IIHMR	Rachit Sharma
3	Date of Submission to the Committee	06/06/2018
4	Date of Submission to the Agency	
5	Review Category of the Proposal	
	Expedited Review	
	Full Review	√
	Exemption from Review	
6	Date of Review	11/06/2018
7	Reviewer's Name	Dr S D Gupta, Dr Anoop Khanna, Dr Nutan Jain,
8	Reviewer's Feedback (Please tick the following, if you are satisfied)	
8.1	Respect for person	√
8.2	Fair subject selection	√
8.3	Informed consent	√
8.4	Maintaining privacy	√
8.5	Maintaining confidentiality	√
9	Final Comment	
	Approved without suggestions	
	Approved with suggestions	√
	Sent back for revision and re-submission	
	Not approved	
10	Suggestions are incorporated	Signature

Annexure 8: Cost-Benefit Analysis Calculations (Year wise estimation of cashflows)

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Delhi's Total Population	1,98,55,640	2,02,76,579	2,07,06,443	21145419	21593702	22051489	22518980	22996383	23483906	23981765
Total DALYs attributable to physical inactivity	47653.53526	48663.7902	49695.46256	50749.00636	51824.8853	52923.57286	54045.55261	55191.31832	56361.37427	57556.23541
Delhi Per Capita NSDP	165476.5017	176563.4273	188393.1769	201015.5197	214483.5596	228853.9581	244187.1732	260547.7138	278004.4107	296630.7062
Delhi Value of Statistical Life (VSL)	81083.48581	86516.07936	92312.65668	98497.60467	105096.9442	112138.4394	119651.7149	127668.3798	136222.1612	145349.046
Delhi Value per Disability Adjusted Life Year (Value per DALY)	17612.74663	18209.99029	18824.64122	19457.16904	20108.05549	20777.79471	21466.8935	22175.8717	22905.2625	23655.61275
Assumptions										
Delhi Work Participation Rate	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%
Labour Income Share of GDP	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%
Value of DALY to NSDP cap ratio	1428102891	1575456965	1737752642	1916484544	2113295186	2329989474	2568550620	2831157611	3120204362	3438320747
Calculations for Maximum Initial Outlay Value										
Maintenance Cost	1029180	1049763.6	1070758.872	1092174.049	1114017.53	1136297.881	1159023.839	1182204.315	1205848.402	1229965.37
Net Cashflow Values	1427073711	1574407202	1736681883	1915392370	2112181168	2328853176	2567391596	2829975406	3118998514	3437090782
Calculations for Current Initial Outlay Value										
Maintenance Cost	61200	62424	63672.48	64945.9296	66244.84819	67569.74516	68921.14006	70299.56286	71705.55412	73139.6652
Net Cashflow Values	1428041691	1575394541	1737688969	1916419598	2113228941	2329921904	2568481699	2831087311	3120132656	3438247607

Annexure 9: Cost-Benefit Analysis Calculations (estimation of NPV and BCR values at Maximum Initial Outlay and at discount rates of 5% and 3%)

Calculations for Maximum Initial Outlay Value			
Year	**Cashflows**	**Discount Rate 5%**	**Discounted Cashflow Values**
2018	-14904948000		
2019	1415415729	0.907029478	1283823790
2020	1561546329	0.863837599	1348922430
2021	1722496147	0.822702475	1417101843
2022	1899747598	0.783526166	1488501953
2023	2094929779	0.746215397	1563268856
2024	2309832853	0.71068133	1641555085
2025	2546423836	0.676839362	1723519885
2026	2806863916	0.644608916	1809329507
2027	3093527458	0.613913254	1899157506
2028	3409022857	0.584679289	1993185061
		Total Cashflow	**16168365915**
		NPV	**1263417915**
		Benefit Per Park	₹85,527.88
		BCR	**1.1**

Year	**Cashflows**	**Discount Rate 3%**	**Discounted Cashflow Values**
2018	-14904948000		
2019	1415415729	0.942595909	1334165076
2020	1561546329	0.915141659	1429036098
2021	1722496147	0.888487048	1530415517
2022	1899747598	0.862608784	1638738966
2023	2094929779	0.837484257	1754470709
2024	2309832853	0.813091511	1878105486
2025	2546423836	0.789409234	2010170491
2026	2806863916	0.766416732	2151227470
2027	3093527458	0.744093915	2301874957
2028	3409022857	0.722421277	2462750644
		Total Cashflow	**18490955414**
		NPV	**3586007414**
		Benefit Per Park	₹2,42,757.07
		BCR	**1.2**

Annexure 10: Cost-Benefit Analysis Calculations (estimation of NPV and BCR values at Current Initial Outlay and at discount rates of 5% and 3%)

Calculations for Current Initial Outlay Value			
Year	**Cashflows**	**Discount Rate 5%**	**Discounted Cashflow Values**
2018	-8863200000		
2019	1416383709	0.907029478	1284701777
2020	1562533668	0.863837599	1349775332
2021	1723503233	0.822702475	1417930375
2022	1900774826	0.783526166	1489306813
2023	2095977552	0.746215397	1564050720
2024	2310901582	0.71068133	1642314610
2025	2547513939	0.676839362	1724257709
2026	2807975820	0.644608916	1810046250
2027	3094661600	0.613913254	1899853772
2028	3410179683	0.584679289	1993861433
		Total Cashflow	**16176098790**
		NPV	**7312898790**
		Benefit Per Park	₹4,95,051
		BCR	**1.8**

Year	**Cashflows**	**Discount Rate 3%**	**Discounted Cashflow Values**
2018	-8863200000		
2019	1416383709	0.942595909	1335077490
2020	1562533668	0.915141659	1429939654
2021	1723503233	0.888487048	1531310300
2022	1900774826	0.862608784	1639625062
2023	2095977552	0.837484257	1755348202
2024	2310901582	0.813091511	1878974459
2025	2547513939	0.789409234	2011031028
2026	2807975820	0.766416732	2152079653
2027	3094661600	0.744093915	2302718866
2028	3410179683	0.722421277	2463586360
		Total Cashflow	**18499691073**
		NPV	**9636491073**
		Benefit per park	₹6,52,348.43
		BCR	**2.1**