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Physical Activity and Cholesterol: Contrasting Patterns in Rural and Urban Environments

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Abstract

Exercise has also been found to be one of the most important factors affecting cardiovascular health and is a major contributor to blood cholesterol regulation. But with urbanization, the technological development and lifestyle changes, there are definite disparities between rural and urban populations when it comes to physical activity. This study compares people who live in rural areas with those living in urban areas to investigate the link between physical activity and cholesterol. The main goal is to explore the effects of changes in physical activity on the serum cholesterol profile with particular attention to total cholesterol, low-density (LDL) and high-density (HDL) cholesterol, and triglycerides. A comparative research design was used, and the participants were chosen from both rural and urban area and the data collection methods used were structured questionnaires and clinical cholesterol assessments. Descriptive and comparative statistical techniques were employed to analyze the data. The results showed that people in rural areas are more likely to be physically active in the past week, both occupationally and recreationally, and have healthier cholesterol levels, with lower total cholesterol and LDL levels, and higher HDL levels. The urban respondents, on the other hand, have more sedentary lifestyles, less levels of

physical activity, and comparatively poor levels of cholesterol profile, which put them at a greater risk of cardiovascular diseases. The study also reveals that dietary practices, work routines, socio-economic status and provision of recreation facilities are significant variables that contribute to these disparities. The findings highlight the significance of encouraging regular physical activity and healthy lifestyle habits, especially in urban areas, for lowering the incidence of hypercholesterolemia and cardiovascular diseases. The study adds to the accumulating body of evidence which supports lifestyle-based interventions and offers valuable suggestions to public health policy, health providers, and health researchers for achieving better cardiovascular outcomes in various populations.

keywords: Physical Activity, Cholesterol, Rural Population, Urban Population, Cardiovascular Health, LDL, HDL, Sedentary Lifestyle, Lipid Profile, Public Health.

1 Introduction

Exercise is known to be one of the most powerful lifestyle factors to help prevent chronic diseases and keep people healthy. Physical activity helps maintain healthy heart and circulatory function, body weight, metabolism, and mental health. Physical activity is important for many health reasons, one of the most important is the regulation of blood cholesterol levels, one of the most important cardiovascular diseases. Cholesterol is a vital lipid that is needed to produce hormones, construct cell membranes and generate vitamin D. When total cholesterol and low-density lipoprotein (LDL) levels are high and high-density lipoprotein (HDL) is low, there is a great risk of developing atherosclerosis, hypertension, heart attacks and strokes.

Due to rapid urbanisation and lifestyle changes, there are considerable

differences between physical activity patterns in rural and urban populations. Farm work and manual work are physically demanding jobs, whereas jobs in cities are mostly desk-bound and sedentary with the use of mechanised transport and higher screen time. These lifestyle changes could have direct effects on cholesterol levels and cardiovascular health.

Thus, it is important to know the association between physical activity and cholesterol at different residential contexts for planning effective public health interventions. The purpose of this study is to compare the physical activity levels and cholesterol levels of residents in rural and urban areas to provide evidence-based recommendations for decreasing physical activity and improving cardiovascular health and healthy lifestyles.

1.1 Background of the Study

Unhealthy lifestyle is one of the most important causes of cardiovascular diseases, which are one of the major causes of death in the world. Physical inactivity has been recognized by WHO as one of the leading risk factors for non-communicable diseases such as obesity, cardiovascular diseases, hypertension and diabetes. At the same time, the incidence of abnormal cholesterol levels has risen as a result of dietary changes, low levels of physical activity, stress, and sedentary lifestyle. The health issues have grown more acute in developed and developing nations, due to the continuing change of the traditional life in the urban areas.

Traditionally, rural people have been active and busy in the countryside, doing farming, walking and other manual activities. The opposite, however, has been the case in city areas, where sedentary jobs, reliance on motorized transport and technology-centric leisure activities have become more common in urban areas. These behavioural differences affect energy expenditure, body composition and lipid

metabolism, leading to differences in both the amount and the profile of cholesterol in rural and urban populations.

Numerous studies have shown that people who exercise moderately to vigorously regularly tend to have lower total cholesterol and LDL cholesterol and higher HDL cholesterol. However, other factors such as socioeconomic status, access to health services, eating habits, education and environment also play a role in these health outcomes. Thus, a comparison between rural and urban areas offers important clues to the effect of environmental and behavioral variables on cholesterol regulation. This background is used to investigate the association between physical activity and cholesterol in contrasting living environments.

1.2 Physical Activity: Concept and Importance

Physical activity is any movement of the body that requires energy expenditure and is produced by skeletal muscles. This covers activities of daily living, chores, walking, cycling, leisure activities, games and exercise routines. International health recommendations call for adults to get at least 150 minutes a week of moderate-intensity physical activity or 75 minutes a week of vigorous physical activity to stay healthy. Exercise helps maintain muscle strength, stamina, flexibility and fitness and helps to prevent chronic diseases.

The importance of physical activity extends beyond physical fitness. Promotes better blood flow, better insulin sensitivity, regulates blood pressure, boosts immunity and helps maintain emotional balance and prevent anxiety, depression and stress. It has one of the most important physiological effects, that is, it positively affects lipid metabolism. Exercise improves high-density lipoprotein (HDL) cholesterol, and reduces low-density lipoprotein (LDL) cholesterol and triglyceride levels. These changes help to decrease the build-up of plaque in arteries and increase the function of the cardiovascular system.

Increased sitting time, high exposure to screen time and less recreational exercise has led to decreased levels of physical activity, especially in cities, in modern lifestyle. In contrast, rural people may be physically active in their occupations, though this has been closing the gap over the years. Encouraging children, adolescents, adults and the elderly to be more physically active is thus viewed as one of the most effective and cost-efficient means of preventing cardiovascular diseases, enhancing quality of life and extending longevity.

1.3 Cholesterol and Cardiovascular Health

Cholesterol is a fatty substance that is essential for normal physiological functions and is wax-like in nature. Essential for the construction of cell membranes, it is also used to make steroid hormones, vitamin D, and to help the body digest food by making bile acids. Cholesterol is transported in the bloodstream by lipoproteins, mainly low-density lipoprotein (LDL), high-density lipoprotein (HDL), and very low-density lipoprotein (VLDL). Cholesterol is a necessary component to the health of the body, but too much LDL can lead to the buildup of plaque in the walls of the arteries, which raises the likelihood of cardiovascular diseases.

Atherosclerosis is caused by high LDL cholesterol or high triglycerides, which narrow blood vessels, causing reduced blood flow and increasing the risk of heart attack and stroke. HDL cholesterol, on the other hand, helps to clear excess cholesterol from the arteries and carry it to the liver to get rid of it, which is beneficial to cardiovascular health. Therefore, the proper balance of LDL and HDL cholesterol is important to minimize cardiovascular risk.

Lifestyle factors like excess alcohol intake, smoking, chronic stress, physical inactivity and unhealthy diet have a significant impact on cholesterol levels. Exercise helps improve lipid metabolism through a reduction of LDL cholesterol and the increase of HDL cholesterol and thus decreases cardiovascular risk. Routine cholesterol screening is vital to prevention of cardiovascular diseases, along with a healthy diet and exercise. Public health campaigns focusing on lifestyle change remain one of the most effective ways of positively influencing cardiovascular outcomes and health system load.

1.4 Rural and Urban Lifestyle Differences

There are lifestyle differences between rural and urban regions and these differences have a significant impact on physical activity and cardiovascular health. Traditional activities in rural areas are related to agriculture, animal husbandry, physical work, and long walks. These are done daily and naturally lead to an increased level of physical activity, energy expenditure and physical fitness. Also, rural areas tend to offer more opportunities for getting outside and less reliance on mechanized transportation.

In contrast, the city-dwelling lifestyle has become more sedentary as work has increasingly occurred in an office setting, technology has evolved, the use of motorized transport has increased, and extended periods of time spent with digital devices. Decreased physical activity and an increased intake of processed foods, fast foods and sugary drinks lead to obesity and high cholesterol. People living in urban areas also tend to have more work stress, irregular working hours, and poorer sleep quality, which could also contribute to cardiovascular risk.

In spite of improved health facilities and awareness, lifestyle related diseases are on the rise due to unhealthy lifestyle. Rural populations may have difficulties accessing health care services, may not have as much health care literacy, and may receive a delayed diagnosis for cholesterol related disorders. The differences in these characteristics result in important differences in health outcomes between the rural and urban populations. Recognizing these lifestyle differences is critical to developing targeted public health interventions to promote regular physical activity, nutrition and cholesterol management among different communities.

1.5 Need of the Study

- To compare levels of physical activity in rural and urban populations.
- To compare the levels of cholesterol in both rural and urban population.
- To be able to detect lifestyle factors that affect cardiovascular health.
- To evaluate if there is a relationship between the results of physical activity and cholesterol profiles.
- To develop evidence supporting preventive health care strategies.
- Provide assistance to health promotion lifestyle modification programs.
- To promote awareness of the importance of regular exercise and a healthy lifestyle.
- To enlighten policy makers to design effective public health programs.

1.5 Significance of the Study

- Supplies scientific data on the link between exercise and cholesterol.
- Assesses and identifies high risk groups that need preventive interventions.
- Supports public health efforts to prevent cardiovascular diseases.
- Promotes healthy lifestyles in rural and urban communities.
- Helps researchers with further comparative health studies.
- Encourages awareness about the benefits of exercising regularly.
- Supports evidence-based health care planning and policy-making

1.6 Scope of the Study

- Physical activity levels of the rural and urban population are compared.
- It assesses levels of important cholesterol types (Total Cholesterol, LDL, HDL and Triglycerides).
- It explores the connection between exercise and heart health.

- Researchers have been exclusively studying participants who are adults in selected rural and urban areas.
- It makes suggestions to public health policies and lifestyle interventions.
- The results can be beneficial for healthcare providers, policy makers, and researchers.

1.7 limitations to the study.

- It excludes the general population of the country and the study may not be applicable to all the rural and urban areas.
- Physical activity data from self-report could be subject to recall bias.
- There are things besides exercise that can affect cholesterol that relate to diet and genetics.
- All cardiovascular risk factors were not evaluated in the study; it primarily concentrates on cholesterol.
- Sample size and geographic coverage may be constrained by time and/or resources.
- The results of the study might be affected by the environment and socioeconomic factors.
- The results of the cross section might not prove a cause-and-effect link between physical activity and cholesterol levels.

2. Review of Literature

1 Anoop Misra, Naveed Sattar, and Jayakrishnan K. Joshi (2007)

Anoop Misra, Naveed Sattar and Jayakrishnan K Joshi reviewed the rising prevalence of obesity, dyslipidaemia and cardiovascular diseases in Asian Indians. They pointed out that the rapid urbanization and the deterioration of the nutritional habits, as well as the reduction of physical activity have contributed to the high prevalence of cholesterol-related disorders. The authors found that moderate exercise has an important place in the reduction of LDL cholesterol, the rise of HDL cholesterol and the decrease of cardiovascular risk. In that respect they suggested lifestyle changes to be the leading prevention method for the development of dyslipidaemia and coronary artery disease.

2 Jaya Prasad Tripathy, J. S. Thakur, Gursimer Jeet, Sohan Chawla, Sanjay Jain (2016)

The study comparing the rural and urban population in India was done by Jaya Prasad Tripathy, J. S. Thakur, Gursimer Jeet, Sohan Chawla and Sanjay Jain and conducted the study with the help of WHO STEPS survey. The study revealed that people living in urban areas were much less active physically, and also indicated higher levels of obesity and cholesterol related risk factors than those in rural areas. While the situation with physical inactivity is worsening in rural areas, urban people are still at higher

risk because they are more sedentary and have unhealthy eating habits. The authors stressed the importance of encouraging physical activity to decrease cardiovascular diseases.

3. Vivek Podder, Raghuram Nagarathna, Akshay Anand, Suchitra S. Patil, Amit Kumar Singh, Hongasandra Ramarao Nagendra (2021)

Vivek Podder, Raghuram Nagarathna, Akshay Anand, Suchitra S. Patil, Amit Kumar Singh and Hongasandra Ramarao Nagendra carried out the countrywide survey to evaluate the physical activity of the people of India. The results indicated that there were significant differences between rural and urban populations for physical activity by occupation, with rural people generally being more physically active than urban people. The researchers found that the progressive increase of physical inactivity, especially in urban areas, is a significant factor of obesity, dyslipidaemia and cardiovascular diseases.

4. Rajeev Gupta, K. Srinath Reddy, Dorairaj Prabhakaran, 2017

Rajeev Gupta, K. Srinath Reddy and Dorairaj Prabhakaran discussed the epidemiological data on dyslipidaemia in India. They have shown that the urban population has significantly higher levels of total cholesterol and LDL cholesterol than the rural population. The authors also noted that low HDL cholesterol is prevalent in Indian adults irrespective of their living location. They called upon to have more physical activity, balanced nutrition and early screening of cholesterol as necessary steps to be taken to bring down the burden of cardiovascular diseases in India.

5. Kushal Madan and J. P. S. Sawhney (2024)

The available evidence relating exercise and lipid metabolism was examined by Kushal Madan and J. P. S. Sawhney in Indian population. They said the regular aerobic exercise substantially lowers triglycerides and LDL cholesterol and raises HDL cholesterol. The authors concluded that physical activity is a non-pharmacological effective and inexpensive treatment to prevent dyslipidemia and to increase cardiovascular fitness. They suggested that structured exercise programmes be incorporated into the regular healthcare and community-based preventive services.

6. Senthil K. Vasan, Belavendra Antonisamy, Mahasampath Gowri, Hepsy Y. Selliah, Finney S. Geethanjali, Felix S. Jebasingh, Thomas V. Paul, and Nihal Thomas (2020)

The longitudinal study comparing the cardiovascular risk factors in rural and urban South India was done by Senthil K. Vasan, Belavendra Antonisamy, Mahasampath Gowri, Hepsy Y. Selliah, Finney S. Geethanjali, Felix S. Jebasingh, Thomas V. Paul, and Nihal Thomas. In both populations, the

prevalence of hypercholesterolemia, obesity and other CVRs increased, and was more prevalent in the urban population. The researchers found that physical inactivity, unhealthy lifestyles, and dietary modifications are significant factors for impacting lipid profiles and they advocated for preventive public health interventions to be geared toward physical activity and healthy living.

3 Research Methodology

3.1 Research Design

In this study the researchers used a Descriptive Comparative Research Design, or at least that s how it s laid out. The idea is that it compares two separate populations, rural and urban, in terms of their physical activity patterns and cholesterol levels, but there is no tinkering, no manipulation of any variables. The main purpose is to lay out what is currently happening, then look for contrasts and also certain connections between the variables that were picked for observation.

3.2 Sample Size

Altogether 100 respondents took part in the study, so basically the sample was made up of a hundred individuals.

Area	Number of Respondents
Rural Population	50
Urban Population	50
Total	**100**

3.3 Data collection method

The study used a mix of Primary and Secondary data, like not just one thing.

Primary data

- Structured Questionnaire
- Personal Interviews
- Physical activity assessment
- Cholesterol test reports covering Total Cholesterol, LDL, HDL, and Triglycerides.

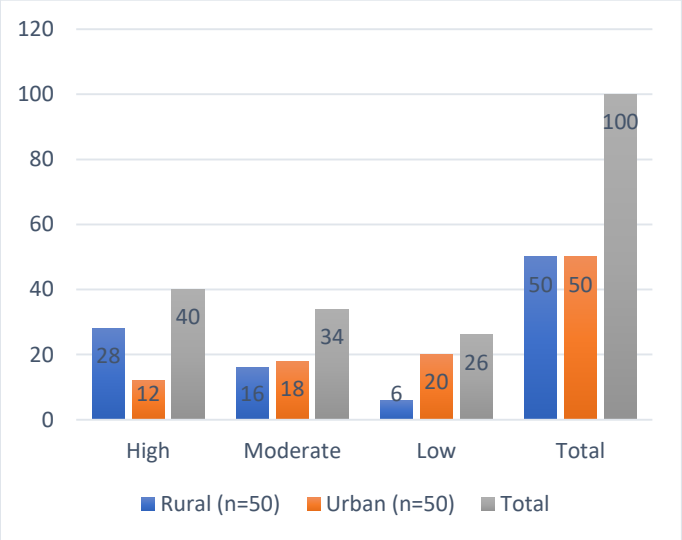
Secondary data

- Research articles
- WHO reports,
- and government health reports
- journals,
- books
- published research papers

4 Data analysis

Table 1: Physical Activity Level of Respondents

Physical Activity Level	Rural (n=50)	Urban (n=50)	Total	Percentage (%)
High	28	12	40	40%
Moderate	16	18	34	34%
Low	6	20	26	26%
Total	**50**	**50**	**100**	**100%**



Interpretation

The results showed that 40% of the respondents had high level of physical activity. More than two-thirds of this group (28 respondents) lived in rural areas and had more active roles in physically demanding occupations and activities. Thirty-four percent of respondents were moderately physically active, 26% were inactive, and the highest number of respondents were from urban areas. The findings have shown that generally, urban residents lead a more sedentary lifestyle than the rural residents.

5 Discussion

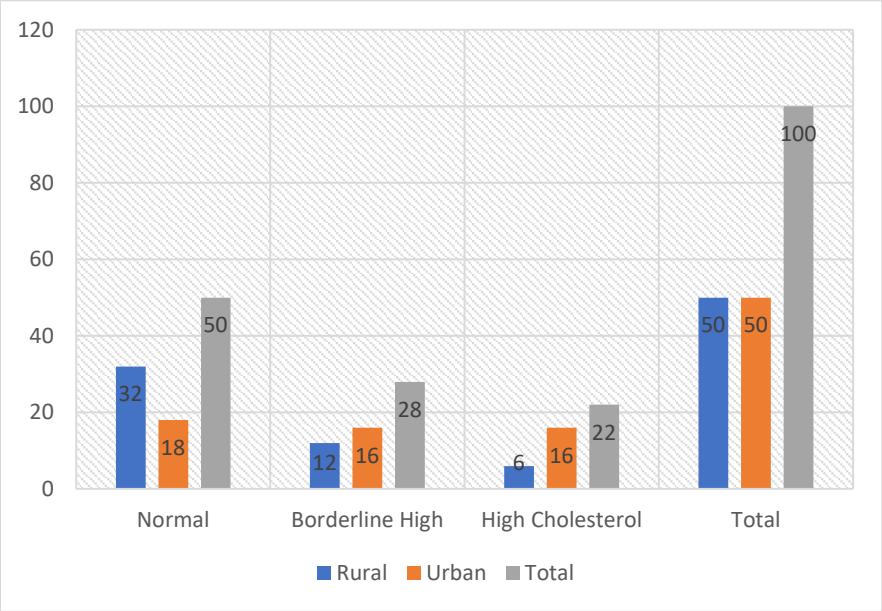
The findings of the present study showed a significant relationship between level of physical activity and cholesterol profile in both rural and urban people. Rural people were physically more active because of agricultural activities, manual labor and outdoor activities. As a result, they had better cholesterol levels, such as lower total cholesterol, lower LDL cholesterol and higher percentages of normal lipid status. By contrast, those who lived in urban areas indicated less physical activity, mostly because of sedentary work and the use of motorized transportation and screen time. The items which were lifestyle-related and associated with an increase in the prevalence of borderline and elevated cholesterol levels were:The following lifestyle characteristics were associated with increased borderline and elevated cholesterol levels:

The results are in line with earlier research that showed that exercise had a beneficial effect on lipid metabolism and decreased the appearance of cardiovascular diseases. While access and awareness of healthcare is overall higher in urban communities, unhealthy food choices, work stress, and insufficient physical activity remain a risk factor for poor cardiovascular outcomes. The study also emphasizes the need to adopt healthy lifestyle practices irrespective of the residential situation. Regular physical activity, healthy eating and regular cholesterol checks significantly lower cardiovascular risk. The results of this study underscore the need for public health interventions than can be targeted towards these communities, especially those in urban areas that have grown more sedentary.

Table 2: Cholesterol Status of Respondents

Cholesterol Status	Rural	Urban	Total	Percentage (%)
Normal	32	18	50	50%
Borderline High	12	16	28	28%

Cholesterol Status	Rural	Urban	Total	Percentage (%)
High Cholesterol	6	16	22	22%
Total	**50**	**50**	**100**	**100%**



Interpretation

The findings showed that 50% of respondents had normal cholesterol levels, while the majority of the rural respondents had normal levels. Nearly a quarter (28%) had borderline high cholesterol levels and a fifth (22%) had high cholesterol levels. The proportion of people with high cholesterol was significantly higher among the urban respondents, indicating that poor lipid profile is associated with sedentary lifestyle and unhealthy dietary habits related to the lifestyles of the rural and urban people.

6 Conclusion

The research has shown that exercise plays a significant role in cholesterol levels and cardiovascular health. Overall, rural participants tended to be more active and had more favorable cholesterol profiles than urban participants. Those living in cities were more likely to be sedentary and have high cholesterol, putting them at a higher risk for cardiovascular disease. The comparison results highlight

the importance of lifestyle factors, including consistent exercise, in maintaining a healthy lipid profile and reducing the risk of chronic diseases.

The study also shows that rural-urban differences in the environment and work have a significant impact on daily energy expenditure and cardiovascular risk. The advantages of active lifestyles in rural areas are high, but may be slowly diminished with the higher degree of mechanization and work patterns. Therefore, it is recommended that people in rural and urban areas should be encouraged to exercise regularly and have balanced diets. The policies should focus on lifestyle modification programmes, community awareness campaigns and preventive health screening programmes to decrease the incidence of cholesterol related disorders. In general, encouraging physical activity is one of the best, most cost-effective and most sustainable interventions for cardiovascular health promotion and improving the quality of life in populations of all ages, genders, and racial/ethnic groups.

7 Suggestions

- Increase adults' participation in moderate activity to at least 150 minutes a week.
- Conduct Community Fitness and Awareness sessions in Rural and Urban areas.
- Encourage healthy eating, including less saturated fat and processed foods.
- Regularly check cholesterol and cardiovascular health.
- Raise awareness on health effects of sedentary lifestyle.
- Create parks, walking tracks and recreation facilities to promote exercise.
- Promote employee wellness and physical fitness programs in the workplace.
- Improve the health education curriculum in schools and colleges on active lifestyles.
- Government should carry out preventive health education campaigns for cardiovascular diseases.
- More research is needed in the future with larger samples and several geographic areas to enhance generalizability.

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