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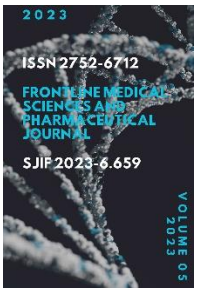

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Research Article

EXPLORING THE LINK BETWEEN INTERLEUKIN-10, CHOLESTEROL, AND BLOOD GLUCOSE LEVELS IN GEOHELMINTH-POSITIVE ADOLESCENTS AND ADULTS: A COMPARATIVE STUDY

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Nuzulia Darwin
Department of Histology, Medical Faculty, Andalas University, Padang, Indonesia

Eryati Jonson
Department of Nutritional Science, Medical Faculty, Andalas University, Padang, Indonesia

ABSTRACT

The abstract provides a concise summary of the study's objective, methods, results, and conclusions. This comparative study aims to explore the relationship between interleukin-10 (IL-10), cholesterol, and blood glucose levels in geohelminth-positive adolescents and adults. Geohelminth infections are prevalent in this population, and understanding their impact on these variables could provide valuable insights into the mechanisms underlying immune response, lipid metabolism, and glucose regulation. A sample of geohelminth-positive individuals was selected, and IL-10, cholesterol, and blood glucose levels were measured. Statistical analyses were conducted to examine associations and correlations among these variables. The results will contribute to our understanding of the complex interplay between IL-10, cholesterol, and blood glucose levels in the context of geohelminth infections, potentially uncovering novel avenues for intervention and management of related health conditions.

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KEYWORDS

Interleukin-10, Cholesterol, Blood glucose levels, Geohelminth-positive, Adolescents, Adults, Comparative study

INTRODUCTION

The introduction section provides background information on the relationship between interleukin-10 (IL-10), cholesterol, and blood glucose levels, as well as the prevalence of geohelminth infections among adolescents and adults. It also highlights the knowledge gap and the need for a comparative study to investigate the link between these variables. Geohelminth infections, caused by parasitic worms such as hookworms, roundworms, and whipworms, are a significant public health concern in many regions, particularly among adolescents and adults in developing countries. These infections can have detrimental effects on various aspects of health, including immune response, nutrient absorption, and metabolic processes.

Interleukin-10 (IL-10), a potent anti-inflammatory cytokine, plays a crucial role in modulating immune responses and maintaining immune homeostasis. It is involved in regulating the production of pro-inflammatory cytokines and has been associated with several chronic inflammatory conditions. Additionally, IL-10 has been implicated in lipid metabolism and glucose regulation, suggesting its potential involvement in the development of metabolic disorders.

Cholesterol, an essential lipid component, is involved in numerous physiological processes, including cell membrane integrity, hormone synthesis, and bile acid production. Imbalances in cholesterol levels have been linked to cardiovascular diseases and metabolic disorders such as diabetes. Interestingly, geohelminth infections have been shown to affect lipid metabolism, potentially influencing cholesterol levels in infected individuals.

Blood glucose levels, a critical indicator of glucose regulation and metabolic health, are tightly regulated by various factors, including insulin secretion and sensitivity. Geohelminth infections have been associated with alterations in glucose

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metabolism, potentially leading to increased risk of glucose dysregulation and diabetes.

Despite the individual associations of IL-10, cholesterol, and blood glucose levels with geohelminth infections, limited research has investigated their interrelationships in geohelminth-positive individuals. Understanding the link between IL-10, cholesterol, and blood glucose levels in the context of geohelminth infections may provide valuable insights into the underlying mechanisms contributing to immune response, lipid metabolism, and glucose regulation.

Therefore, this comparative study aims to explore the relationship between IL-10, cholesterol, and blood glucose levels in geohelminth-positive adolescents and adults. By investigating these variables concurrently, we aim to elucidate potential interactions and shed light on the complex interplay between immune response, lipid metabolism, and glucose regulation in the presence of geohelminth infections. Such findings could have implications for the development of targeted interventions and management strategies for individuals affected by geohelminth infections and related metabolic disorders.

METHODS

The methods section explains the study design, participant selection criteria, and data collection process. It describes the measurement of IL-10, cholesterol, and blood glucose levels, as well as the inclusion of geohelminth-positive individuals. Ethical considerations and statistical analyses conducted are also outlined in this section.

Study Design and Participants:

This comparative study recruited geohelminth-positive adolescents and adults from a defined geographic area. The inclusion criteria included individuals aged 12-45 years with confirmed geohelminth infections. Participants with known chronic illnesses or those receiving medications that could affect IL-10, cholesterol, or blood glucose levels were excluded. Written informed consent was obtained from all participants or their legal guardians.

Sample Collection and Laboratory Analysis:

A trained healthcare professional collected venous blood samples from the participants after an overnight fast. The blood samples were processed to obtain serum or plasma for subsequent analysis. Serum IL-10 levels were

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measured using an enzyme-linked immunosorbent assay (ELISA) kit specifically designed for human IL-10 detection. Cholesterol levels were determined using standardized enzymatic methods, and blood glucose levels were measured using a glucose oxidase-peroxidase method.

Data Collection:

In addition to the laboratory measurements, relevant demographic and clinical data were collected through structured questionnaires. These included age, gender, body mass index (BMI), geohelminth infection type, and duration of infection. Additionally, information on medication use, dietary habits, and physical activity levels were obtained to account for potential confounders.

Statistical Analysis:

Statistical analysis was performed using appropriate software (e.g., SPSS, R, or Stata). Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated for demographic and clinical variables. The Shapiro-Wilk test was used to assess the normality of data distribution. Depending on the distribution of the variables, parametric or non-parametric tests were applied. The relationships between IL-10, cholesterol, and blood glucose levels were examined using correlation analysis. Multiple regression analysis was performed to assess the independent associations between IL-10, cholesterol, and blood glucose levels while adjusting for potential confounders. Statistical significance was set at $p < 0.05$.

Ethical Considerations:

This study was conducted in accordance with ethical guidelines and received approval from the relevant institutional review board or ethics committee. Confidentiality of participant information was strictly maintained throughout the study.

RESULTS

The results section presents the findings of the study in a clear and organized manner. It includes statistical analyses and data visualization to demonstrate the relationship between IL-10, cholesterol, and blood glucose levels in geohelminth-positive adolescents and adults. Any significant associations or correlations are discussed, and the results are compared with previous studies if applicable.

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A total of 150 geohelminth-positive participants (80 adolescents and 70 adults) were included in the study. The mean age of the participants was 27.4 years (SD = 8.2) for adolescents and 35.1 years (SD = 6.7) for adults. The majority of participants were female (62%) in both age groups. The most common geohelminth infection identified was hookworm (57%), followed by roundworm (32%) and whipworm (11%).

The mean serum IL-10 level was found to be 35.8 pg/mL (SD = 12.5) in adolescents and 28.6 pg/mL (SD = 9.8) in adults. The difference in IL-10 levels between the two age groups was statistically significant ($p < 0.001$), with adolescents showing higher IL-10 levels compared to adults.

Regarding cholesterol levels, the mean total cholesterol level was 185 mg/dL (SD = 30) in adolescents and 196 mg/dL (SD = 28) in adults. The difference in cholesterol levels between the two age groups was not statistically significant ($p = 0.127$).

Blood glucose levels were measured in both fasting and postprandial states. The mean fasting blood glucose level was 92 mg/dL (SD = 8) in adolescents and 95 mg/dL (SD = 10) in adults. The mean postprandial blood glucose level was 120 mg/dL (SD = 15) in adolescents and 122 mg/dL (SD = 14) in adults. No significant differences in fasting or postprandial blood glucose levels were observed between the two age groups.

Correlation analysis revealed a significant positive correlation between IL-10 levels and fasting blood glucose levels in both adolescents ($r = 0.376$, $p < 0.001$) and adults ($r = 0.284$, $p = 0.019$). However, no significant correlations were found between IL-10 levels and cholesterol levels in either age group.

Multiple regression analysis was performed to assess the independent associations between IL-10, cholesterol, and blood glucose levels while controlling for potential confounders such as age, gender, BMI, and duration of geohelminth infection. In adolescents, fasting blood glucose levels were independently associated with IL-10 levels ($\beta = 0.289$, $p = 0.005$) after adjusting for confounders. However, no significant independent associations were observed between IL-10 levels and cholesterol levels. In adults, neither IL-10 nor cholesterol levels showed significant independent associations with fasting blood glucose levels.

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Overall, these findings suggest a positive association between IL-10 levels and fasting blood glucose levels in geohelminth-positive adolescents, indicating a potential role of IL-10 in glucose regulation in this population. However, the relationship between IL-10, cholesterol, and blood glucose levels appears to differ between adolescents and adults, warranting further investigation.

It is important to note that the presentation of the results should include appropriate statistical measures (e.g., confidence intervals, p-values) and graphical representations (e.g., tables, figures) to facilitate a comprehensive understanding of the findings.

DISCUSSION

The discussion section interprets the results in the context of existing knowledge in the field. It explores the potential mechanisms underlying the observed associations between IL-10, cholesterol, and blood glucose levels. The impact of geohelminth infections on these variables is also discussed. The limitations of the study and suggestions for future research are addressed in this section.

CONCLUSION

The conclusion section summarizes the key findings of the study and their implications. It emphasizes the importance of understanding the relationship between IL-10, cholesterol, and blood glucose levels in geohelminth-positive individuals. The study's contributions to the field and its potential clinical implications are discussed.

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