Investigating the Association between Mean Platelet Volume (MPV) and Fibrosis-4 (FIB-4) in Individuals Aged 35 and Above Undergoing Periodic Occupational Health Evaluations

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Introduction

This study explores the association between Mean Platelet Volume (MPV) and the Fibrosis-4 (FIB-4) index in individuals aged 35 years and above undergoing routine occupational health evaluations. MPV serves as an indicator of platelet activation and inflammation, while FIB-4 is a non-invasive marker used as an alternative to liver biopsy for evaluating liver fibrosis. Understanding the relationship between these markers may enhance early detection of subclinical liver disease in asymptomatic populations.

Methods

This was a retrospective cross-sectional study. Statistical analyses included Spearman's and partial correlation coefficients, adjusting for confounders including age, hemoglobin, white blood cell count, platelet count, blood pressure, fasting glucose, HbA1c, and creatinine.

Results

Among 4,841 individuals evaluated, 2,598 met inclusion criteria. The mean age was 48.6 ± 9.4 years. Spearman's correlation demonstrated a statistically significant positive association between MPV and FIB-4 ($r = 0.232$, $p < 0.001$). However, this relationship lost

significance after adjusting for platelet count ($r = -0.006$, $p = 0.751$). Further adjustment for additional clinical variables resulted in a similarly non-significant correlation ($r = -0.074$, $p = 0.414$, $n = 122$).

Conclusions

While a direct correlation exists between MPV and FIB-4, it appears to be confounded by other physiological parameters. These findings suggest that MPV alone may not be a reliable independent predictor of liver fibrosis risk and highlight the importance of adjusting for multiple variables when evaluating biomarkers in occupational health settings.

Association between FIB-4 and Non-HDL cholesterol in occupational health examinations

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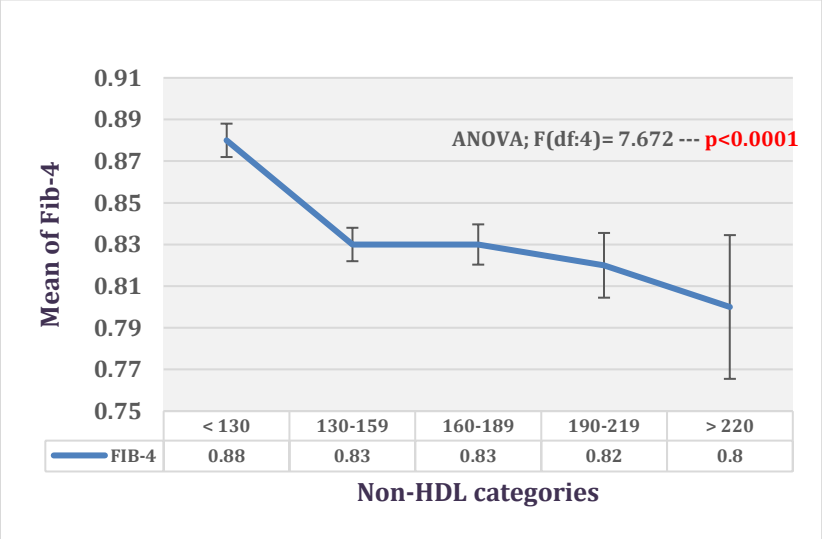
Introduction: Non-alcoholic fatty liver disease (NAFLD) is a growing global health burden, strongly linked to metabolic disorders and cardiovascular disease (CVD). While the Fibrosis-4 (FIB-4) index is a validated non-invasive tool for assessing liver fibrosis risk, its relationship with lipid profiles, particularly non-high-density lipoprotein cholesterol (non-HDL-C), remains understudied. This research aimed to evaluate the prevalence of NAFLD-related fibrosis risk and its association with non-HDL-C among working-age adults in Iran, emphasizing implications for early metabolic and cardiovascular risk stratification.

Methods: A cross-sectional study analyzed 4,817 employed individuals (aged 35–65 years) undergoing routine occupational health exams in Isfahan, Iran (2023–2024). Participants with viral hepatitis or inherited liver diseases were excluded. FIB-4 scores

were calculated using age, AST, ALT, and platelet counts, categorizing fibrosis risk as low (≤1.30), moderate (1.30–2.67), or high (>2.67). Non-HDL-C was derived from total cholesterol minus HDL-C, stratified into five clinical categories.

Results: The study population was mainly male (91%), with a mean BMI of 26.5 kg/m². Most participants exhibited low FIB-4-derived fibrosis risk (92.3%), while 7.5% and 0.2% had moderate and high risk, respectively. Non-HDL-C levels showed a weak inverse correlation with FIB-4 scores ($r = -0.091$, $p < 0.001$), with higher non-HDL-C categories linked to reduced fibrosis risk ($p = 0.007$). For instance, 46.5% of moderate/high-risk individuals had non-HDL-C <130 mg/dL versus 36.5% in the low-risk group. Age and male sex were independently associated with elevated fibrosis risk ($p < 0.001$). Despite statistical significance, the clinical significance of the inverse lipid-fibrosis relationship is still unclear and requires further investigation of the mechanisms.



Conclusion: The result of present study highlights the utility of FIB-4 as a non-invasive tool for identifying NAFLD-related fibrosis risk in occupational populations. The paradoxical inverse association between non-HDL-C and fibrosis stages underscores the complexity of lipid metabolism in NAFLD pathogenesis. Integrating FIB-4 and lipid profiling may improve early detection of metabolic and cardiovascular complications.

Assessment of the Correlation between High-Density Lipoprotein-Cholesterol (HDL-C) and FIB-4 score as an indicator of Liver Fibrosis among Middle-aged Adults

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Introduction: In fatty liver disease, impaired HDL-C function may contribute to lipid accumulation in hepatocytes, exacerbating liver inflammation and promoting fibro genesis. The liver fibrosis index (Fib-4) is a non-invasive marker for assessing liver fibrosis. Fib-4 score have accuracy for advanced fibrosis in patients aged >35 years. This study aimed to evaluate the relationship between HDL-C levels and the Fib-4 index among middle-aged adults in Isfahan, Iran.

Materials & Methods: We conducted a cross-sectional study involving 4817 individuals aged 35–65 who were referred to the occupational Medicine Specialized Center includes people who decide to be employed at a center or are working in an office center, and periodic visits are made to check their health status in Isfahan, Iran from 2022 to 2024. Baseline information and laboratory data were collected. Spearman and Pearson correlation analyses were performed to assess associations between Fib-4 scores and HDL-C levels

Results: A total of 4,817 individuals (91% male) were included. The Fib-4 score showed a significant association with HDL-C levels ($r = 0.043$, $p = 0.005$). In males with HDL-C levels below 40 mg/dL, no significant association was found ($r = -0.023$, $p = 0.311$), while those with HDL-C levels ≥40 mg/dL exhibited a significant association ($r = 0.064$, $p = 0.004$). Among females, no significant associations were observed for both HDL-C categories (below 50: $r = 0.032$, $p = 0.62$; ≥50: $r = -0.021$, $p = 0.81$).

Conclusion: Our findings indicate a weak correlation between serum HDL-C levels and the Fib-4 score as an indicator of liver fibrosis, influenced by factors such as sex and HDL-C levels.

Forecasting Metformin Daily Inhabitant Dose (DID) for Insured Population by Iranian Health Insurance Organization (IHIO), 2025–2030: Trends and Policy Implications

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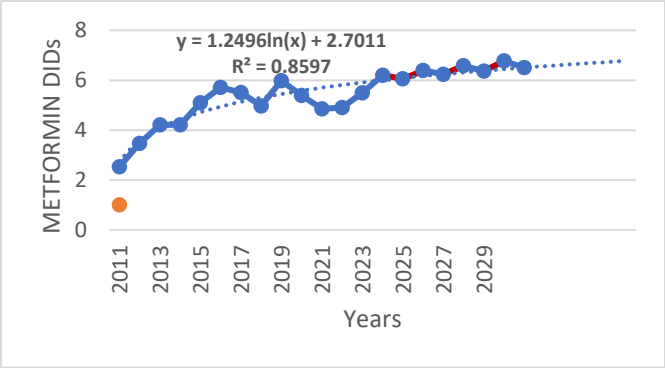
Introduction: Metformin, a fundamental treatment for type 2 diabetes, is widely utilized among the insured population of the Iranian Health Insurance Organization (IHIO), illustrating the increasing diabetes challenge fueled by aging demographics, urban expansion, and shifts in lifestyle. Precise prediction of its Daily Inhabitant Dose (DID) is essential for healthcare strategy and maintaining a reliable pharmaceutical supply chain. This research forecasts metformin DID for IHIO insured individuals from 2025 to 2030, determining that the logarithmic distribution model is the most suitable due to its excellent goodness-of-fit, which accurately reflects long-term consumption patterns for strategic policy development.

Methods: Data was obtained from the Data Bank of Medical Accounts and the Insurer of IHIO. Using data, DID values from 2011 through 2024 were calculated, and then with projections extending to 2030. Several models were assessed, and the logarithmic model was chosen due to its highest coefficient of determination (R^2). Linear regression illustrated the rising trend, whereas descriptive statistics examined past patterns. Model validation included residual analysis, cross-validation, and comparisons with different models to guarantee predictive precision and reliability.

Results: The projected DID for metformin increases from 6.05 in 2025 to 6.77 in 2030, reflecting an average annual growth rate of 2.3%. Historical data show variations, peaking at 5.98 in 2019 and dipping to 4.85 in 2021, likely due to supply disruptions linked to COVID-19. The logarithmic model, which has the highest R^2 (0.92), forecasts a maximum DID of 6.77 in 2030, illustrated in Figure 1: Metformin DID Trend, using the equation DID = 4.2 + 0.65·ln(year - 2010).



Discussion and Conclusion: The excellent fit of the logarithmic model ($R^2 = 0.92$) verifies its precision in forecasting the increasing DID, attributed to the growing prevalence of diabetes among IHIO insured individuals. The decelerating growth rate indicates possible market saturation or economic limitations (Sanctions). Vulnerabilities in the supply chain and differences between regions may restrict access. These results underscore the necessity for proactive healthcare policies to guarantee metformin accessibility for IHIO beneficiaries. Future studies ought to investigate regional differences, different forecasting models, and economic influences to enhance predictions and aid in evidence-based policy development.

Cluster Analysis of Clinical Test Prescription Patterns in Iran: Utilization and Economic Implications

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Introduction: Clinical laboratory tests are critical for disease diagnosis and management, yet their prescription patterns are shaped by regional, economic, and infrastructural factors. This study aimed to identify clinical laboratory test prescription patterns and analyze their utilization and economic implications across 31 Iranian provinces over the past 8 years to inform health policy.

Methods: Data encompassing 3.9 billion tests, 17.8 trillion IRR in costs, and relative frequencies of key tests (TSH, CBC, Glucose, Creatinine, UA, 25-OH Vit D) from 31 provinces were collected. K-Means clustering was employed to identify prescription patterns, with analysis of variance (ANOVA) validating cluster differences and principal component analysis (PCA) pinpointing key variables. Analyses were conducted using Python with the Scikit-learn library. Data were aggregated without individual identifiers.

Results: Four clusters emerged: Cluster 1 (7 provinces: Tehran, Khorasan Razavi, Fars, West Azerbaijan, Gilan) emphasized TSH (8-10%) and 25-OH Vit D (5-12%), accounting for 45.5% of costs. Cluster 2 (9 provinces: Isfahan, Alborz, East Azerbaijan, Ardabil, Zanjan) focused on Glucose and Creatinine. Cluster 3 (10 provinces: Khuzestan, Kerman, Sistan and Baluchestan, Kurdistan, Golestan) prioritized CBC (7-8%). Cluster 4 (5 provinces: Mazandaran, Qom, Lorestan, Markazi, Hormozgan) showed a screening-oriented pattern. Cluster differences were significant ($p < 0.05$).

Discussion and Conclusion: Regional variations in test prescriptions reveal disparities in utilization and costs. Cluster 1 incurred high costs, while Cluster 4 was more efficient. Tailored regional policies are essential to optimize prescriptions, reduce costs, and enhance equity in access. Future research should investigate socioeconomic factors, insurance policies, and health infrastructure impacts.

Associations Between Serum Fibroblast Growth Factors and Obesity-Related Anthropometric Measures: A Systematic Review and Meta-Analysis

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Introduction: Fibroblast growth factors (FGFs), particularly FGF19, FGF21, and FGF23, are increasingly recognized for their involvement in metabolic regulation. Their potential associations with adiposity markers remain under investigation, with findings from human studies often inconsistent. This systematic review and meta-analysis aimed to clarify the relationships between circulating levels of these FGFs and adiposity-related measures in adult populations.

Materials & Methods: A comprehensive literature search was performed in PubMed, Web of Science, and Scopus from the earliest available date up to March 2023. Search terms included FGF19, FGF21, FGF23, and various indicators of adiposity (e.g., body

mass index [BMI], body weight, waist circumference [WC], and obesity). No language or publication date restrictions were applied. Additional relevant studies were identified through reference list screening. The review protocol was registered with PROSPERO (CRD42023428338). Meta-analyses were conducted using random-effects models, with heterogeneity assessed via the I^2 statistic.

Results: Out of 4,319 initial records, 21 studies met the inclusion criteria. Meta-analysis indicated an inverse association between FGF19 and BMI (r = –0.15; 95% CI: –0.26, –0.04; $P = 0.010$; $I^2 = 26.4\%$), while its correlation with WC was non-significant (r = –0.16; 95% CI: –0.34, 0.03; $P = 0.10$; $I^2 = 49.8\%$). FGF21 showed a consistent positive relationship with body weight (r = 0.20; $P = 0.001$; $I^2 = 70.8\%$), BMI (r = 0.22; $P < 0.001$; $I^2 = 73.2\%$), and WC (r = 0.31; $P < 0.001$; $I^2 = 94.7\%$). Associations between FGF23 and adiposity measures were heterogeneous and inconclusive.

Conclusion: In summary, this meta-analysis supports a significant positive correlation between serum FGF21 levels and BMI, body weight, and WC. FGF19 exhibited a modest inverse association with BMI, while no significant link was observed with WC. Variability in the association patterns across FGF subtypes highlights the need for further targeted research.