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Hypertension, Diabetes Mellitus, and Hyperlipidemia in Rural Dominican Republic

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Abstract

Introduction: Cardiovascular disease (CVD) remains a leading cause of morbidity and mortality globally, with hypertension, diabetes mellitus, and hyperlipidemia being significant risk factors. In the Dominican Republic, particularly in rural areas, these conditions contribute substantially to the overall burden of disease. This study aimed to assess the prevalence of these cardiovascular risk factors among the adult population in Los Montones, a rural community in the Dominican Republic.

Methods: A retrospective, descriptive cross-sectional study design was employed, utilizing data collected during mobile clinic visits in 2019. A total of 195 adult patients, aged 18 to 99 years, were included in the analysis. Physical examinations, along with measurements of blood pressure, glucose levels, and lipid profiles, were conducted to diagnose hypertension, diabetes mellitus, and hyperlipidemia. Diagnoses were based on established clinical guidelines.

Results: The results revealed that 45.1% of the study population was diagnosed with hypertension, 8.9% had elevated glucose levels suggestive of diabetes, and 15% had high total cholesterol levels. Additionally, a significant portion of the population exhibited low HDL cholesterol levels, with 72.5% of women and 63.6% of men affected.

Conclusion: These findings highlight the substantial burden of cardiovascular risk factors in rural Dominican communities, emphasizing the need for targeted public health interventions. The study also underscores the importance of improving healthcare delivery systems and access to care in rural areas to better manage and prevent chronic conditions. Addressing these issues is crucial for reducing the burden of CVD and improving health outcomes in undeserved populations.

Keywords: chronic disease, prevalence, primary health care, rural population

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Introduction

Hypertension, diabetes mellitus, and hyperlipidemia are among the most prevalent cardiovascular risk factors in the Dominican Republic, contributing significantly to the burden of cardiovascular disease (CVD) in the country. Recent studies highlight the alarming prevalence of these conditions, particularly in urban areas such as Santo Domingo, where up to 73% of older adults are affected by hypertension.[1] Similarly, diabetes mellitus and hyperlipidemia are widespread, with 17.5% of the older population diagnosed with diabetes and over 50% of adults displaying elevated cholesterol levels.[2] These figures suggest a significant public health challenge, particularly compared to global statistics. For instance, in the United States, the prevalence of hypertension among adults is around 45%, while diabetes affects approximately 10.5% of the population. Similarly, Japan reports a hypertension prevalence of about 43% among its adult population, indicating that the rates in the Dominican Republic are considerably higher.[3]

While urban data provide a clear picture of the burden of cardiovascular risk factors, the situation in rural areas of the Dominican Republic is equally concerning. Limited studies suggest that the prevalence of hypertension, diabetes, and hyperlipidemia in rural regions may be as

high, if not higher, than in urban settings. For example, a study conducted in Batey 16, a rural area, found that 34% of the population had hypertension, 11% had diabetes, and a significant proportion had hyperlipidemia.[4] The challenges in these rural areas are compounded by limited access to healthcare, lower health literacy, and fewer opportunities for early detection and management of these conditions. This starkly contrasts with urban areas, where healthcare facilities and resources are more readily available, although still inadequate for addressing the high burden of these diseases.

Further studies in rural areas, such as agricultural villages (bateyes), reveal additional concerns, particularly regarding diabetes. A study found that 8.6% of the population in these areas had diabetes, with an additional 20.4% being prediabetic. Alarmingly, 64.8% of participants had never been tested for diabetes, with notably low levels of diabetes knowledge and care-seeking behaviors, especially among Haitian-born residents.[5] These findings underscore the significant burden of undiagnosed diabetes and highlight the disparities in access to care and health literacy within rural populations.

When comparing the prevalence of these conditions in the Dominican Republic to other countries, it becomes evident that the situation is severe, particularly in rural areas. For instance, while diabetes prevalence in the Dominican Republic's rural areas is comparable to some urban centers in high-income countries, the rate of hypertension and hyperlipidemia control remains significantly lower.[6] This disparity is particularly concerning given the associated risks of cardiovascular diseases and the limited healthcare infrastructure in these regions. Comparatively, rural populations in countries like Brazil also experience a higher burden of cardiovascular risk factors due to similar socioeconomic challenges and healthcare disparities.

Understanding the incidence and prevalence of hypertension, diabetes mellitus, and hyperlipidemia in rural areas is critically important for several reasons. It provides a foundation for targeted public health interventions that address the unique challenges faced by these communities, such as limited access to healthcare, lower health literacy, and socioeconomic barriers. Furthermore, accurate data is essential for developing effective prevention and management strategies to reduce cardiovascular disease burden in these underserved populations. Addressing these disparities is crucial for improving individual health outcomes, reducing overall healthcare costs, and improving the quality of life in rural areas of the Dominican Republic.

The purpose of this study is to describe the prevalence of hypertension, diabetes mellitus, and hyperlipidemia in a rural area of the Dominican Republic called Los Montones.

Methods

Design and Sample

This study utilized a retrospective analytical cross-sectional design, drawing on data collected during mission trips to Los Montones, Dominican Republic. In collaboration with Union Medical del Norte in Santiago de los Caballeros, the [Blinded for Review] organization provided primary healthcare services to the rural population of Los Montones. The data for this study were gathered from a mobile clinic conducted in partnership with local nurses, pharmacists, and physicians in 2019. During these clinic visits, nurse practitioner students and faculty members performed physical examinations and prescribed treatment regimens. Although both adult (18 years and older) and pediatric patients (<18 years) were seen at the clinics, this manuscript reports solely on the adult population. A total of 195 adult patient visits were included in the analysis. The analysis covered the entire population of patients assessed. Additionally, a sample size calculation was unnecessary as the study utilized descriptive and nonparametric statistics.

Physical Exams

The physical examinations assessed the patient's overall condition and included a thorough evaluation of the eyes, ears, nose, and pharynx using a Welch Allyn otoscope and ophthalmoscope diagnostic set (97250). The examination also involved inspection, palpation, and auscultation of the neck, cardiovascular, pulmonary, and gastrointestinal/abdominal systems. The genitourinary system was also examined when relevant to the patient's chief complaint. Following a cephalocaudal approach, the students examined the lower back and extremities, assessing the extremities for tenderness, edema, deformities, and cyanosis, palpating peripheral pulses, and checking capillary refill.

Measures

Hypertension was diagnosed based on two separate blood pressure readings above 140/90 mmHg.[7] Measurements were initially obtained using a Welch Allyn Pro BP 2000 electronic blood pressure monitor, with an appropriately sized cuff based on the patient's arm circumference. Elevated readings were manually confirmed with a Welch Allyn DS44-11C Durashock Aneroid sphygmomanometer. Diabetes mellitus was diagnosed according to the American Diabetes Association (ADA)[8] criteria, which include a random plasma glucose level of 200 mg/dL or higher, accompanied by symptoms of diabetes such as polyuria, polydipsia, and polyphagia. A

StatStrip Nova Biomedical glucometer was used for glucose measurements, and daily controls were conducted for both low and high glucose levels to ensure accuracy.

To assess participants' lipid profiles, the CardioChek PA analyzer was used, a system previously validated as a reliable point-of-care testing method for lipids.[9] Blood tests were performed to measure LDL, HDL, triglycerides, and total cholesterol levels. Hyperlipidemia was diagnosed by the American College of Cardiology guidelines, where participants were diagnosed with hyperlipidemia if their total cholesterol exceeded 200 mg/dL or if their LDL cholesterol was greater than 100 mg/dL.[10]

Other diagnoses were made based on clinical evaluation. Gastroesophageal reflux disease (GERD) was presumptively diagnosed based on the presence of symptoms such as heartburn and regurgitation, along with physical examination findings.[11] Tinea infections were diagnosed through physical examination.[12] Dehydration was diagnosed based on clinical manifestations including diarrhea, vomiting, decreased urine output, physical exam findings such as dry mucous membranes, and vital signs indicating tachycardia and tachypnea.[13,14] Upper respiratory infections were diagnosed based on clinical symptoms and physical examination findings.[15]

Prescribed Treatments

During the clinic, treatments were prescribed by local physicians from Union Medica del Norte, who paired with UM students and faculty members. Treatment protocols, such as those from the American Heart Association and the American College of Cardiologists, were followed to select appropriate pharmacological agents, with a preference for first-line treatments. For patients with a history of renal disease, angiotensin-converting enzyme inhibitors (ACE inhibitors) were prescribed by the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8) guidelines. A faculty member and a local physician-reviewed and verified all diagnoses and treatment plans developed by nurse practitioner students.

Standardized Documentation

The standardized documentation sheet used in the study was organized into seven distinct sections. The top section captured demographic details, including the patient's name, age, gender, and chief complaint. The second section recorded vital signs such as height, weight, waist circumference, and head circumference (the latter applicable only to pediatric patients). The third section was designated for documenting any tests conducted during the visits and their results. Available tests included urine dipstick, point-of-care glucose, point-of-care cholesterol, and a 12-lead ECG. Urine dipstick findings noted on the sheet included the presence of blood, glucose, nitrite, and leukocyte esterase. Cholesterol information documented encompassed total cholesterol, HDL, LDL, triglycerides, and cholesterol ratio. The fourth section allowed students to record the patient's past medical, family, and social history, including tobacco use, alcohol consumption, and drug use. This section also included space for listing home medications and any known drug allergies. The fifth section detailed the physical examination as previously described. Below the physical exam was a section for documenting the patient's diagnosis, followed by a list of medications prescribed based on the diagnosis. This list was designed to align with the commonly available drugs from the formulary and over-the-counter medications typically provided by the research team. Students could either circle the selected medications or document any alternative medications under the 'other' category if they were not listed.

Data Analysis

Data were manually entered into SPSS Statistics® (IBM, version 24) and double-checked for verification. Descriptive statistics and frequencies were generated and reported using SPSS Version 28. Specifically, means and standard deviations were computed for continuous variables, and frequency counts and percentages were computed for categorical variables. After analyzing the overall sample, data were also analyzed separately by gender.

Results

Total Sample

A total of 195 adults were treated in the clinic. Age of the patients ranged from 18 to 99 (M = 56.31, SD = 17.39). Table 1 displays the most common diagnoses for the total adult sample and by gender. Among adults in the total sample Hypertension was the most common diagnosis (45.1%) followed by GERD (9.7%). In addition, 42.6% of the patients had a systolic blood pressure greater than 140, 23.1% had a diastolic blood pressure greater than 90, 8.9% had glucose greater than 200, and 15% had high total cholesterol.

Table 1. Most Common Diagnoses by Gender.

Diagnosis	Males N (%)	Females N (%)	Total Sample N (%)
Hypertension	40 (51%)	48 (41)	88 (45)
GERD	7 (9)	12 (10)	19 (10)
Upper respiratory infection	1 (1)	2 (2)	3 (2)
Bacterial vaginosis	-	3 (3)	3 (2)
Diabetes	1 (1)	2 (2)	3 (2)

Males. A total of 79 males were treated in the clinic aged 18 to 95 years old (M = 58.80, SD = 18.35). Table 2 displays the average age, blood pressure, glucose, and cholesterol by gender and for the entire sample of adult patients. Males were found to have an average systolic blood pressure of M = 144.03 (SD = 26.37) and an average diastolic blood pressure of M = 82.87 (SD = 13.89). Their average glucose was M = 125.57 (SD = 56.63). Their average total cholesterol was M = 140.93 (SD = 36.13), average LDL was M = 84.24 (SD = 31.05), average HDL was M = 38.61 (SD = 11.73), and average triglycerides was M = 136.91 (SD = 77.26). The most common diagnosis among males was hypertension (50.63%), followed by GERD (8.9%). In male patients, 53.2% had a systolic blood pressure greater than 140, 26.6% had a diastolic blood pressure greater than 90, 11.6% had glucose greater than 200, 6.8% had high total cholesterol, and 63.6% had low HDL.

Table 2. Average Age, Blood Pressure, Glucose, and Cholesterol by Gender.

Variable	Males M (SD)	Females M (SD)	Total Sample M (SD)
Age	58.80 (18.35)	54.62 (16.58)	56.31 (17.39)
Systolic Blood Pressure	144.03 (26.37)	135.86 (26.03)	139.17 (26.41)
Diastolic Blood Pressure	82.87 (13.89)	82.34 (11.44)	82.55 (12.46)
Glucose	125.57 (56.63)	121.12 (60.17)	122.93 (58.62)
Total Cholesterol	140. 93 (36.13)	163.16 (42.94)	154.50 (41.70)
LDL	84.24 (31.05)	89.73 (34.59)	87.80 (33.33)
HDL	38.61 (11.73)	43.49 (11.26)	41.59 (11.64)
Triglycerides	136.91 (77.26)	163.46 (81.28)	153.12 (80.45)

Females. A total of 116 females were treated in the clinic ranging in age from 18 to 99 years old (M = 54.62, SD = 16.58). Females were found to have an average systolic blood pressure of M = 135.86 (SD = 26.03) and an average diastolic blood pressure of M = 82.34 (SD = 11.44). Their average glucose was M = 121.12 (SD = 60.17). Their average total cholesterol was M = 163.16 (SD = 42.94), average LDL was M = 89.73 (SD = 34.59), average HDL was M = 43.49 (SD = 11.26), and average triglycerides was M = 163.47 (SD = 81.28). The most common diagnosis among females was hypertension (41.38%) followed by GERD (10.3%). In female patients, 35.3% had a systolic blood pressure greater than 140, 20.7% had a diastolic blood pressure greater than 90, 7.0% had glucose greater than 200, 20.3% had high total cholesterol, and 72.5% had low HDL.\

Discussion

The findings from this study underscore the significant burden of cardiovascular risk factors, particularly hypertension, diabetes mellitus, and hyperlipidemia, in the rural community of Los Montones, Dominican Republic. The prevalence of hypertension among the adult population in this study was alarmingly high, with 45.1% of the total sample diagnosed with the condition. This figure is consistent with previous studies conducted in urban areas such as Santo Domingo, where hypertension affects up to 73% of older adults[16]. However, our study reveals that even in rural settings, where access to healthcare is limited, the prevalence remains critically high, highlighting the pervasive nature of this public health issue across different regions of the country.

In comparison to global statistics, the hypertension rates observed in Los Montones are significantly higher than those reported in high-income countries such as the United States and Japan, where the prevalence among adults is approximately 45% and 43%, respectively.[3] The elevated rates in the Dominican Republic, particularly in rural areas, suggest a pressing need for targeted interventions that address the unique challenges faced by these communities, including lower health literacy, fewer healthcare resources, and socio-economic barriers that may contribute to poor disease management and outcomes.

The gender-specific analysis within our study also provides important insights. Males in the sample exhibited higher rates of hypertension (50.63%) and diabetes (11.6%) compared to females, who had a hypertension prevalence of 41.38% and a diabetes prevalence of 7.0%. This gender disparity aligns with global trends, where men often exhibit higher blood pressure levels and are at greater risk for developing cardiovascular diseases at an earlier age compared to women. Additionally, the study highlighted significant issues related to hyperlipidemia, particularly low HDL levels, which were prevalent in both genders but more pronounced in females, with 72.5% of women having low HDL compared to 63.6% of men. These findings are consistent with previous research that identifies low HDL as a common issue in populations with high cardiovascular risk.[6]

The prevalence of diabetes mellitus in the study population, though lower than that of hypertension, is still a cause for concern, especially considering the rates of undiagnosed cases highlighted in previous research conducted in similar rural areas. The study by Madsen Beau De Rochars and colleagues reported that 64.8% of participants in agricultural villages had never been tested for diabetes, which emphasizes the critical need for improved screening and early detection programs in these underserved regions.[17] In our study, 8.9% of the total sample had glucose levels greater than 200 mg/dL, indicating potential diabetes, which mirrors the findings in rural populations where healthcare access is limited.

The results of this study also highlight the importance of adopting context-specific healthcare strategies that consider the unique challenges of rural populations. Given the high rates of hypertension, diabetes, and hyperlipidemia observed, there is an urgent need for comprehensive public health interventions that include community-based education, improved access to healthcare services, and regular screening programs. These interventions should be culturally tailored and involve local healthcare providers to ensure sustainability and effectiveness.

Limitations

This retrospective, descriptive study faced several limitations. One key limitation was the restricted collection of demographic data, which may have limited the comprehensiveness of the analysis. Diagnoses were based primarily on physical examination findings, clinical symptoms, and point-of-care testing, as the study lacked advanced diagnostic tools and laboratory facilities to confirm these diagnoses. Additionally, the study sample consisted only of individuals who were able to attend the mobile clinic, potentially excluding those with more severe health conditions. Despite these challenges, the study provides valuable insights into the current health status and common chronic conditions affecting the rural population in the Dominican Republic.

The findings underscore the need for a better balance between evidence-based practices and the availability of resources in resource-limited settings. The study's scope was narrow, with only a limited range of insights reviewed. In particular, cardiovascular health requires healthcare providers to focus on expanding the delivery system to manage patient conditions and apply lessons learned from past experiences more effectively.

Conclusions

This study reveals a substantial burden of cardiovascular risk factors, including hypertension, diabetes mellitus, and hyperlipidemia, among the rural population of Los Montones, Dominican Republic. The high prevalence of these conditions, coupled with significant gender disparities and the challenges inherent in rural healthcare delivery, underscores the urgent need for targeted public health interventions. These findings highlight the critical importance of improving access to healthcare services, enhancing early detection and screening programs, and implementing community-based education initiatives to mitigate the impact of cardiovascular disease in these underserved areas. Addressing these issues is essential for reducing morbidity and mortality, promoting health equity, and improving the quality of life in rural Dominican communities. Future research should continue to explore the long-term effects of these interventions and further investigate the underlying social determinants that contribute to these health disparities.

Implications

The findings of this study hold significant implications for clinical practice, particularly for global and community health practitioners serving low-income countries. These results shed light on the prevalent chronic illnesses, such as hypertension, diabetes, and hyperlipidemia, among Dominicans living in rural areas. By identifying these common conditions, practitioners can better prepare for service-learning and mission experiences, equipping themselves with the necessary knowledge, supplies, and medications to address the specific health needs of this population. Furthermore, the insights gained from this study can guide the planning of educational efforts for healthcare workers in the Dominican Republic, ensuring they are well-prepared to manage the high burden of cardiovascular diseases in these underserved communities.

The study also underscores the importance of enhancing the management competencies of healthcare providers in the Dominican Republic, particularly in rural areas where the burden of chronic conditions is substantial. Strengthening training programs and providing continuous education for healthcare workers can improve their ability to effectively manage complex cardiovascular issues, thereby reducing hypertension and diabetes. Additionally, fostering a strong connection between the community and healthcare providers through ongoing clinical experiences and education initiatives can lead to more sustainable healthcare practices. By implementing multi-tiered health management teams and ensuring that healthcare workers remain motivated and informed, the healthcare system can better serve the needs of high-risk patients in rural Dominican communities, improving health outcomes and quality of life.

Highlights

What Is Already Known?

Cardiovascular disease (CVD) is a leading cause of morbidity and mortality globally, with hypertension, diabetes mellitus, and hyperlipidemia being major contributing factors. Previous studies have highlighted the high prevalence of these conditions in urban areas of the Dominican Republic, but there is limited data on their prevalence in rural communities.

What Does This Study Add?

This study provides new insights into the prevalence of cardiovascular risk factors in the rural community of Los Montones, Dominican Republic, revealing that nearly half of the adult population suffers from hypertension, with significant rates of diabetes and hyperlipidemia also observed. The findings highlights the urgent need for targeted public health interventions and improved healthcare access in rural areas to address these widespread chronic conditions.

Authors' Contributions
None

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Conflicts of Interest Disclosures
The authors declare that there are no commercial or

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not applicable

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The extent of AI use
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References

1. Yulanka Castro-Dominguez et al. "Patient Awareness and Clinical Inertia: Obstacles to Hypertension Control in Rural Communities in the Dominican Republic." American journal of hypertension (2021). https://doi.org/10.1093/ajh/hpab054.
2. Guzmán, Ashley Karina Reyes, Karla Yorián Martínez Mercado, Michelle Marie Jiménez Mieses, and R. Peralta. "Evaluación del riesgo cardiovascular en adultos del distrito municipal de Santana, Peravia, República Dominicana, durante el periodo noviembre – diciembre 2019 (ERCAS I)." Ciencia y Salud (2021), vol. 5, no. 1, pp. 97-107. https://doi.org/10.22206/cysa.2021.v5i1.pp97-107.
3. World Health Organization. "Hypertension." World Health Organization, 2021, www.who.int/news-room/fact-sheets/detail/hypertension.
4. Gary H. Ho et al. "The Prevalence of Hypertension and Associated Risk Factors in a Latino Subgroup: A Rural Batey Population in the Dominican Republic." Science Journal of Public Health, 2 (2014): 480. https://doi.org/10.11648/J.SJPH.20140205.26.
5. Valery E. Madsen Beau De Rochars et al. "Prevalence of Diabetes, Prediabetes, and Associated Risk Factors Among Agricultural Village Residents in the Dominican Republic." The American journal of tropical medicine and hygiene (2021). https://doi.org/10.4269/ajtmh.19-0942.
6. S. Mejias et al. "Prevalence of peripheral arterial disease among diabetic patients in Santo Domingo, Dominican Republic and associated risk factors." Archives of Medical Sciences. Atherosclerotic Diseases, 3 (2018): e35 - e40. https://doi.org/10.5114/amsad.2018.73527.
7. James PA, Oparil S, Carter BL, et al. 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8). JAMA. 2014;311(5):507–520. Doi:10.1001/jama.2013.284427.
8. American Diabetes Association. 2. Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes-2020. Diabetes Care. 2020 Jan;43(Suppl 1): S14-S31. Doi: 10.2337/dc20-S002. PMID: 31862745.
9. Gao Y, Zhu CG, Wu NQ, Guo YL, Liu G, Dong Q, Li JJ. [Study on the reliability of CardioChek PA for measuring lipid profile]. Beijing Da Xue Xue Bao Yi Xue Ban. 2016 Jun 18;48(3):523-8. Chinese. PMID: 27318918.
10. AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines." Journal of the American College of Cardiology, vol. 73, no. 24, 2019, pp. e285-e350, https://doi.org/10.1016/j.jacc.2018.11.003.
11. Katz PO, Gerson LB, Vela MF. Guidelines for the diagnosis and management of gastroesophageal reflux disease. Am J Gastroenterol. 2013 Mar;108(3):308-28; quiz 329. Doi: 10.1038/ajg.2012.444.
12. Ely JW, Rosenfeld S, Seabury Stone M. Diagnosis and management of tinea infections. Am Fam Physician. 2014 Nov 15;90(10):702-10.
13. Canavan A, Arant BS Jr. Diagnosis and management of dehydration in children. Am Fam Physician. 2009 Oct 1;80(7):692-6.
14. Miller HJ. Dehydration in the Older Adult. J Gerontol Nurs. 2015 Sep 1;41(9):8-13. Doi: 10.3928/00989134-20150814-02.
15. Del Mar C, Glasziou P. Upper respiratory tract infection. Am Family Physician. 2002; 66(11): 2143-2144. Doi: 66(11):2143-2144.
16. Yulanka Castro-Dominguez et al. "Patient Awareness and Clinical Inertia: Obstacles to Hypertension Control in Rural Communities in the Dominican Republic." American journal of hypertension (2021). https://doi.org/10.1093/ajh/hpab054.
17. Valery E. Madsen Beau De Rochars et al. "Prevalence of Diabetes, Prediabetes, and Associated Risk Factors Among Agricultural Village Residents in the Dominican Republic." The American journal of tropical medicine and hygiene (2021). https://doi.org/10.4269/ajtmh.19-0942.