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ORIGINAL

Incidence of community-acquired pneumonia in patients attending the Guna Yala Region

Incidencia de casos de neumonía adquirida en la comunidad de los pacientes que acuden en la Comarca Guna Yala

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ABSTRACT

This research determines the incidence of community-acquired pneumonia cases in the Guna Yala region during the year 2023. The specific objectives include calculating theincidence rate of pneumonia in the Guna Yala region, identifying the risk factors associated with pneumonia in children and adults, comparing the incidence of pneumonia among different age and gender groups, and proposingrecommendations for the prevention and control of pneumonia in the region.

Keywords: Acquired Pneumonia; Guna Yala; Incidence; Mechanical Ventilation; Patient Transfers.

RESUMEN

Esta investigación se determina la incidencia de casos de neumonía adquirida en la comunidad de la Comarca Guna Yala durante el año 2023, dentro de los objetivos específico:calcular la tasa de incidencia de neumonía enla comarca Guna Yala, identificar los factores de riesgo asociados a la neumonía en niños y adultos, comparar la incidencia de neumonía entre diferentes grupos de edad y sexo y proponer recomendaciones para la prevención y control de la neumonía en la región.

Palabras clave: Neumonía Adquirida; GunaYala; Incidencia; Ventilación Mecánica; Traslados de Pacientes.

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INTRODUCTION

Community-acquired pneumonia (CAP) is an infection of the lung parenchyma acquired outside of a hospital setting.[1] Different guidelines define it differently, although it is generally accepted that symptoms must last less than 14 days and must have started in patients who have not been in contact with a healthcare setting for 14 days or within the first 48 hours of admission.

According to WHO data, pneumonia is the leading cause of infectious death in children worldwide. In 2019, it caused 740 180 deaths in children under five, accounting for 14 % of all deaths in this age group. Most of these deaths occur in low-income countries.[1]

METHOD

The study population is between 1 and 65 years old and attends health centers in the region in different districts such as Narganá, Ailigandí, and Tubuala. These health centers collect patient data to monitor them and provide appropriate treatment. Within this, there are diagnostic criteria to confirm a case of community-acquired pneumonia. We follow the diagnostic criteria according to the ATS (American Thoracic Society), primary criteria: need for mechanical ventilation and presence of septic shock; minor criteria: systolic pressure <90 mmHg, multilobar radiographic involvement, and PaO2/FiO2 < 250 mmHg.

CRITERIOS ATS/IDSA PARA ADMISIÓN UCI	
Criterios Mayores —al menos 1—	**Criterios Menores —al menos 3—**
Necesidad de Ventilación Mecánica	FR>30
	$PaFiO_2$ ≤250
Soporte Vasopresor	Infiltrados Multilobares
	Confusión
	BUN >20
	Leucopenia <4.000
	Trombocitopenia <100.000
	Hipotermia <36ºC
	Hipotensión PAD<60 PAS<90

Source: IDSA/ATS criteria for admission to the ICU. JIMDO

Figure 1. ATS/IDSA criteria for admission to the ICU

Distribución de las instalaciones de salud según nivel de atención y grado de complejidad:

		Niveles de atención		
		Primer Nivel	Segundo Nivel	Tercer Nivel
Grados de complejidad	1	Puesto de Salud de Ukupa Puesto de Salud de Carreto Puesto de Salud de La Miel		
	2	Centro de Salud Básico de Wichubhuala Centro de Salud Básico de Río Azúcar Centro de Salud Básico de Río Tigre Centro de Salud Básico de Ticantiki Centro de Salud Básico de Tupile Centro de Salud Básico de Achutupu Centro de Salud Básico de Mamitupu Centro de Salud Básico de Mansucun Centro de Salud Básico de Tubuala Centro de Salud Básico de Armila		
	3	Centro de Salud con camas de Carti Centro de Salud con camas de Río Sidra Centro de Salud con camas de Nargana Centro de Salud con camas de Playón Chico Centro de Salud con camas de Ustupu Centro de Salud con camas de Puerto Obaldía		
	4		Hospital Rural de Mulatupu	
	5		Hospital Regional de Ailigandi	
	6			
	7			

Source: MINSA, (2018)

Figure 2. Distribution of health facilities by level of care and degree of complexity

According to the criteria (figure 1), if the patient meets more than four of the signs and symptoms mentioned, an assessment and physical examination of the patient will be performed, taking into account that not only the criteria are used to diagnose CAP, but also complementary tests such as complete blood count (CBC), due to the limited availability of resources and access to them, only the white blood cell count will be taken into account for the assessment and to conclude the diagnosis.

On the other hand, the severity of patients' signs and symptoms must be considered when deciding whether to transfer them.

According to MINSA (2020), "The health facility network in Kuna Yala is limited to primary care; there are no secondary care facilities. It should be noted that although we have a Regional Hospital, it does not have the installed capacity or human resources to be considered a second-level care facility, so in practice it functions as a first-level care facility like the rest of the facilities in the network (figure 2).

Due to the above, our healthcare network is incomplete, and people who require more specialized care must travel to the capital city to meet their needs for specialized consultations, surgical procedures, and long-term hospitalizations.[2]

MINSA (2018) states, "Each health district in the region has a health facility located at its respective headquarters. Close coordination between each health institution and each district health headquarters facilitates the process of caring for the population. Hospitals and most health centers with beds have a complete basic team consisting of general practitioners, nurses, nursing technicians, statistics technicians, pharmacy technicians, laboratory assistants, ship operators, nutritionists/nutritional assistants, and health educators/promoters. The teams at peripheral health institutions, health posts, and primary health care centers are relatively small given their human resource conditions. We believe it is necessary to strengthen human resources in these areas. Due to their functional diversity, peripheral facilities, in addition to their modernization, cause work overload and burnout syndromes.[4]

DEVELOPMENT

Patient Transfers

According to the Panamanian Ministry of Health (2020), The region has ground transportation equipment for patient transfer (ambulances), whose launch point is in the Llanos de Cartí area (Cartí health area). The nearest referral facility is the Chepo Hospital, which does have specialists in the area. Patients from the health areas of Cartí, Río Sidra, and Narganá are frequently transferred by sea and land to that referral center, while patients from facilities located in the rest of the health areas, such as Playón Chico, Ailigandí, Ustupu, Mulatupu, and Puerto Obaldía, the primary means of transport is by air, with the support of the National Air Service (SENAN). For these patients, the referral facilities are the Santo Tomas Hospital, the Social Security Fund (CSS), the Children's Hospital, and other government or private institutions located in the capital city. It should be noted that if air transport is not possible due to the unavailability of aircraft or weather conditions that make airspace impassable, patients are transported by sea to Llanos de Cartí and then by ambulance to the Chepo Hospital.[2]

Impact

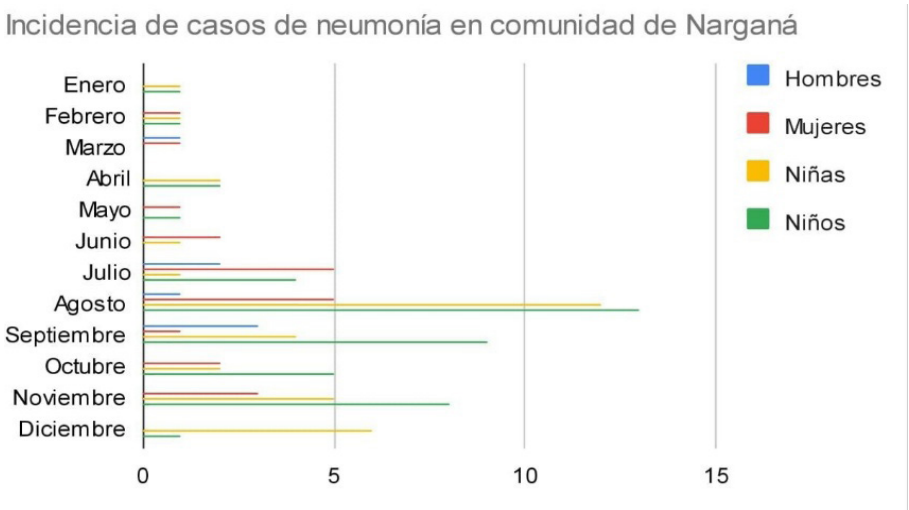

Figure 3. Incidence of pneumonia cases in the community of Narganá

- General incidence. During the year (2023), 145 cases of community-acquired pneumonia were reported in Kuna Yala. This represents an incidence of 5 cases per 1000 inhabitants. (Source: Epidemiology Service of the Ministry of Health, Kuna Yala Region).
- Spatial Distribution. The highest concentration of cases was observed in the district of Narganá, followed by Ailigandí. This uneven pattern could be related to several factors such as population density, access to health services, and risk factors.
- Temporal Distribution. A clear seasonal trend was observed, with a peak in cases during the winter months (July to October). In the case of Narganá, August recorded the highest number of cases, with 13 reports in boys and 12 in girls. This seasonal variability could be associated with climatic factors, such as low temperatures and higher humidity, which favor the transmission of respiratory pathogens (figure 3).

On the other hand, in Ailigandí, November saw a predominance of cases in women (figure 4).

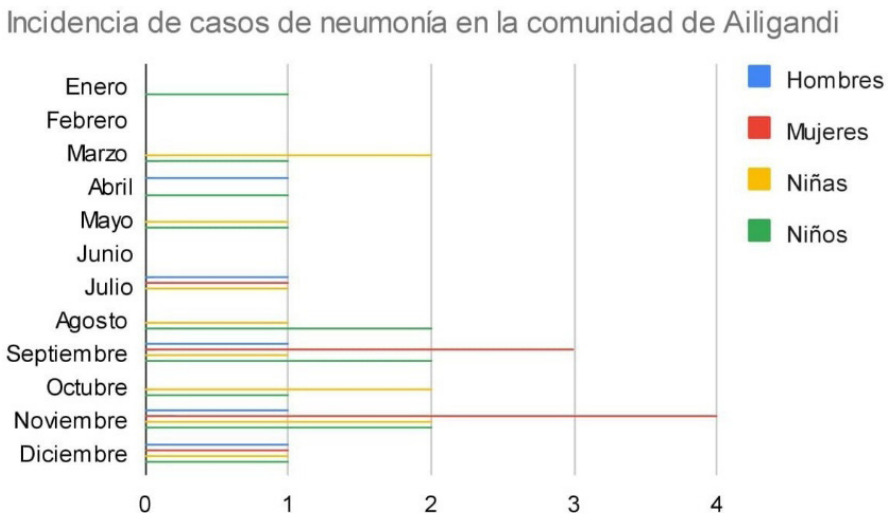

Figure 4. Incidence of pneumonia cases in the community of Ailigandí

Risk factors

Community-acquired pneumonia is a significant public health concern, especially in populations with specific risk factors such as those living in the Guna Yala region. However, there are risk factors that could be particularly relevant, as lack of access to safe drinking water, exposure to wood smoke, chronic diseases, age, and malnutrition, which could specifically lead people in the community to suffer from this disease.

According to the Social Security Fund (2021), One of these factors is age, with an increased risk in people over 65 years of age, chronic lung diseases, and diseases that cause immunosuppression (which lower the body's defenses), as well as children under 5 years of age, who do not yet have sufficiently strong defenses. However, some behaviors or habits put people at risk of contracting the disease, the most important being frequent alcohol consumption and smoking.[3]

Water is supplied in the Guna Yala region through a rural aqueduct system. Some wells are untreated, while in other cases, there is drinking water, as shown in (figure 5).

Aspecto	Cantidad	%	# de Habitantes	%	# de casas	%
Comunidades	59		33,469		5,133	
Acueductos	35	59.3				
Comunidades beneficiadas	46	78	26,658	79.6	4,443	86.6
Con dosificador de cloro	16	45.7				
Sin dosificador de cloro	19	54.3				
Con tratamiento de filtro	24	68.6				
Sin tratamiento de filtro	11	31.4				

Source: MINSA, (2018)

Figure 5. Water supply mechanism

The Guna Yala community has been dumping sewage directly into the sea for many years. This consists of a hanging toilet on the beach with four wooden or cement supports, lined with palm leaves or other materials. Some have flush toilets, but they discharge directly into the sea, and 3,8 % have septic tanks, as shown in (figure 6).[4]

Aspectos	Cantidad	Porcentaje
	5,133	
Letrinas colgantes	1,084	21.1
Letrinas de hueco	39	0.76
Inodoros	197	3.84
Sin excusado, ni letrinas	3,813	74.1

Source: MINSA, (2018)

Figure 6. Distribution of sanitation systems in the community

Access to healthcare facilities

ACCESIBILIDAD A LAS DIFERENTES INSTITUCIONES DE SALUD

INSTALACIÓN DE SALUD	VÍA DE COMUNICACIÓN	MEDIO DE TRANSPORTE	TIEMPO DE ACCESO (COM. PERIFÉRICAS)
CENTRO SALUD BASICO DE WICHUBHUALA	MARITIMA	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	15 – 30 MINUTOS
CENTRO DE SALUD CON CAMAS DE CARTI SUGDUP	MARITIMA	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	15 MIN – 4 HORAS
CENTRO DE SALUD CON CAMAS DE RIO SIDRA	MARITIMA	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	15 MIN – 2 HORAS
CENTRO DE SALUD BASICO DE RIO AZÚCAR	CAMINOS	CAMINANDO	5 – 10 MINUTOS
CENTRO DE SALUD CON CAMAS DE NARGANA	MARITIMA	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	30 MIN. - 3 HORAS
CENTRO DE SALUD BASICO DE RIO TIGRE	CAMINO	CAMINANDO	5 – 10 MINUTOS
CENTRO DE SALUD BASICO DE TICANTIKI	CAMINO	CAMINANDO	5 – 10 MINUTOS
CENTRO DE SALUD CON CAMAS DE PLAYÓN CHICO	MARITIMA	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	30 MIN. 4 HORAS
CENTRO DE SALUD BASICO DE TUPILE	CAMINO	CAMINANDO	5 – 10 MIN.
PUESTO DE SALUD DE UKUPA	CAMINO	CAMINANDO	5-10 MIN
HOSPITAL REGIONAL DE AILIGANDI	MARITIMA	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	20 MIN. – 8 HORAS
CENTRO DE SALUD BASICO DE ACHUTUPU	CAMINO	CAMINANDO	
CENTRO DE SALUD BASICO DE MAMITUPU	CAMINO	CAMINANDO	5 – 10 MIN.
CENTRO DE SALUD CON CAMAS DE USTUPU	CAMINO	CAMINANDO	5 – 10 MIN
CENTRO DE SALUD BASICO DE MANSUCUN	CAMINO	CAMINANDO	5 – 10 MIN.
HOSPITAL RURAL DE NVO. SASARDI	MARÍTIMO	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	20 MIN. – 4 HORAS
CENTRO DE SALUD BASICO DE TUBUALA	MARÍTIMO, CAMINO	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO, CAMINANDO	10 – 45 MIN
PUESTO DE SALUD DE CARRETO	CAMINO	CAMINANDO	5-10 MIN
CENTRO DE SALUD BASICO DE ARMILA	CAMINO	CAMINANDO	5 – 10 MIN.
CENTRO DE SALUD CON CAMAS DE PUERTO OBALDIA	MARITIMA	BOTE CON MOTOR FUERA DE BORDA, CAYUCOS A VELA, CAYUCOS A REMO	30 MIN. – 2 HORA
PUESTO DE SALUD DE LA MIEL	CAMINO	CAMINANDO	5 – 10 MIN.

Source: MINSA, (2018)

Figure 7. Accessibility to different health institutions

Responsibility by health area and population situation

No updated data are available, but the population is believed to have grown exponentially since 2023, the last population census (figure 8).[5,6]

Provincia, comarca indígena y grupos de edad	Población			Índice de masculinidad (hombres por cada 100 mujeres)
	Total	Hombre	Mujer	
Veraguas	**259,791**	**133,287**	**126,504**	105.4
0 - 4	19,785	10,063	9,722	103.5
5 - 9	21,829	11,205	10,624	105.5
10 - 14	21,899	11,302	10,597	106.7
15 - 19	21,577	11,091	10,486	105.8
20 - 24	20,490	10,506	9,984	105.2
25 - 29	18,792	9,504	9,288	102.3
30 - 34	17,320	8,655	8,665	99.9
35 - 39	16,325	8,235	8,090	101.8
40 - 44	15,769	8,090	7,679	105.4
45 - 49	14,846	7,647	7,199	106.2
50 - 54	14,402	7,455	6,947	107.3
55 - 59	12,936	6,712	6,224	107.8
60 - 64	11,701	6,203	5,498	112.8
65 - 69	9,675	5,106	4,569	111.8
70 - 74	7,894	4,264	3,630	117.5
75 - 79	5,953	3,115	2,838	109.8
80 - 84	4,500	2,202	2,298	95.8
85 - 89	2,598	1,253	1,345	93.2
90 - 94	1,119	508	611	83.1
95 - 99	305	141	164	86.0
100 y más	76	30	46	65.2
Mediana	31	31	31	..
Comarca Kuna Yala	**32,016**	**15,308**	**16,708**	91.6
0 - 4	4,076	2,000	2,076	96.3
5 - 9	4,311	2,223	2,088	106.5
10 - 14	4,069	2,073	1,996	103.9
15 - 19	2,866	1,464	1,402	104.4
20 - 24	2,143	996	1,147	86.8
25 - 29	1,893	847	1,046	81.0
30 - 34	1,806	826	980	84.3
35 - 39	1,640	724	916	79.0
40 - 44	1,450	685	765	89.5
45 - 49	1,346	574	772	74.4
50 - 54	1,253	569	684	83.2
55 - 59	1,178	516	662	77.9
60 - 64	1,107	489	618	79.1
65 - 69	894	385	509	75.6
70 - 74	787	397	390	101.8
75 - 79	621	281	340	82.6
80 - 84	343	166	177	93.8
85 - 89	165	77	88	87.5
90 - 94	45	12	33	36.4
95 - 99	13	1	12	8.3
100 y más	10	3	7	42.9
Mediana	21	19	23	..

Source: INEC, (2023)

Figure 8. Population in the Republic, by sex, province, indigenous region, and age group: 2023 census

RECOMMENDATIONS

Improve access to healthcare

- Expand health tours to more neglected or hard-to-reach areas, seeking to improve vaccination coverage to prevent vaccine-preventable diseases.
- Ensure that facilities have the necessary supplies and equipment to treat patients.
- Hire more human resources, including medical specialists who make weekly visits with good salaries to provide more timely health services.
- Train health center doctors and nurses on the most common diseases according to their incidence.

Implement early prevention strategies

- Education based on educational talks promoting hand washing and personal hygiene to prevent the spread of

respiratory diseases.

- Raise awareness in the community about seeking early care from health services to ensure timely treatment and avoid complications.

Improving living conditions and reducing pollution

- Promote improved ventilation in homes and reduce exposure to indoor smoke, especially from wood- or coal-burning stoves.
- Develop strategies in conjunction with the local government to control waste and sewage in communities.
- Promote the use of improved (gas) stoves to reduce exposure to indoor smoke.

CONCLUSIONS

The study on the incidence of community-acquired pneumonia (CAP) in the Guna Yala region in 2023 shows that this public health problem is of great relevance, with a rate of 5 cases per 1000 inhabitants and a total of 145 reports. The districts of Narganá and Ailigandí have the highest concentration of cases, which could be linked to their population density and limited access to health services. Factors such as restricted access to safe drinking water, poor sanitation, and continuous exposure to wood smoke inside homes significantly influence the prevalence of the disease, especially among children under five and people over 65. A seasonal pattern was observed, with increased cases during the coldest and wettest months, coinciding with the general trend for respiratory infections in similar climates. August was a month with a notable increase in cases in Narganá, highlighting the need to adopt preventive measures during critical periods.

The study also points out that the health infrastructure in the region is limited, consisting mainly of primary care centers and no secondary hospitals, which means that seriously ill patients must be transferred to the capital, either by air or sea. This presents a significant obstacle to rapid access to medical care, and factors such as weather conditions and lack of resources exacerbate the situation. It is therefore urgent to improve the local health system, including increasing medical visits to remote areas, ensuring that health centers are well-stocked, and providing sufficient health personnel. It is also crucial to carry out community awareness campaigns that promote preventive measures such as respiratory hygiene and improve living conditions by reducing exposure to smoke in homes and promoting adequate sanitation.

The combination of preventive strategies, improvements in health infrastructure, and community education can significantly reduce the incidence of pneumonia in Guna Yala. However, for these actions to have a real and lasting impact, they must be implemented sustainably and adapted to the specific needs of the population.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

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