

Etiological and Evolutionary Profile of Anemia in Outpatients at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes

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Abstract

Original Research Article

Introduction: Anemia is one of the most common public health problems in the world and affects all ages. **Objective:** To describe the etiologic and evolutionary profile of anemia in the internal medicine unit of the Fousseyni Daou hospital in Kayes. **Methodology:** It was a descriptive and cross-sectional study with retrospective data collection which took place from January 1 to December 31, 2020 at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes. It covered all anemic patients seen in outpatient clinics during the study period. **Results:** We identified 197 cases of anemia out of 1883 patients admitted to the Unit, either a hospital prevalence of 10.46%. The age group from 26 to 35 years was the most represented, that is to say 67 cases (34.01%) with an average age of 25 years, the female sex predominated, 107 cases (54.31%) with a sex ratio of 0.84. Housewives represented 104 cases (52.8%). The majority of patients resided in rural areas 48 cases (52.75%). Gastropathy was the most found antecedent 76 cases (38.58%) followed by hypertension 53 cases (26.90%); 121 patients (61.42%) had no history. The main clinical manifestations were: conjunctival pallor 118 cases (59.9%), vertigo 112 cases (56.85%), physical asthenia 109 cases (55.33%), dyspnea 101 cases (51.26%), headaches 99 cases (50.25%). The associated pathologies were: hypertension 76 cases (38.58%), followed by malnutrition (anorexia) 67 cases (34.01%). Biologically, microcytic anemia was the most frequent 127 cases (64.47%), followed by normocytic anemia 53 cases (26.90%) and macrocytic anemia 17 cases (8.63%). Normochromic anemia was more encountered in 104 cases (52.79%) compared to anemia hypochromic 93 cases (47.21%). Mild anemia was more frequent 119 cases (60.41%) followed by moderate anemia 62 cases (31.47%). Anemia was severe in 16 cases (8.12%). The main etiologies of anemia were iron deficiency 98 cases (49.75%) followed by infections (anemia of inflammatory origin) with 73 cases (30.06%). The evolution was favorable in 187 patients (94.92%), the lethality linked to anemia was 1.02%. **Conclusion:** Anemia is a common condition in current hospital practice. Its severity is associated with the decrease in the immune capacity of patients and the multiple associated pathologies.

Keywords: Anemia, etiology, evolution, therapy, internal medicine, Fousseyni Daou Hospital, Kayes, Mali.

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INTRODUCTION

Anemia remains a major public health problem in the world, due to its magnitude and severity. It is expressed when the level of circulating hemoglobin in the blood is low. The limits set by the WHO are

respectively 12 g/dl in women, 13 g/dl in men, 11g/dl in pregnant women and 14g/dl in children [1].

It affects more than 1.64 billion people, or 24.8% of the world's population. The highest prevalence is reported in low- and middle-income countries with an overall frequency above 40% [2].

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It is an indicator of undernutrition, poverty and present in parasitized people (helminthiasis: ascariasis, trichocephalosis) [1, 2].

In Mali, data from the statistical directory (Local Health Information System) for 2019 report 51,070 cases of anemia, including 21,376 cases among people aged 15 to 65 and over in first-level health structures with 707 cases of overall death, including 269 deaths among people aged 15 to 65 and over. These data show the extent of anemia in our populations [3].

The consequences of anemia are many and varied. It affects physical growth, cognitive development, reproduction and physical work capacity resulting in decreased human performance [2].

We did not find any work relating to the epidemiological, clinical, biological aspects of anemia in the internal medicine unit of the Fousseyni Daou hospital in Kayes.

Thus, we carried out this work in order to describe these different aspects to contribute to the improvement of the management of anemia.

METHODOLOGY

It was a descriptive and cross-sectional study with retrospective data collection which took place from January 1 to December 31, 2020 at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes. Included were all consenting patients seen in an outpatient setting during the period of our study and presenting with anemia. Patients admitted to an outpatient clinic without anemia were excluded from the study.

The diagnosis of anemia was retained when the complete blood count shows a hemoglobin level < 13g/dl in men and 12g/dl in women.

The finding of anemia requires the analysis of the following biological parameters.

The mean corpuscular volume (MCV) which makes it possible to separate:

- Microcytic anemia (VGM < 80 fl),
- Macrocytic anemia (VGM > 100 fl),
- Normocytic anemia (80 fl < VGM < 100 fl).

The mean corpuscular Hb content (TCMH): (N: 27-32 pg) makes it possible to differentiate hypochromia (TCMH < 27 pg) from normochromia (TCMH ≥ 32 pg).

The mean corpuscular hemoglobin concentration (MCHC) makes it possible to differentiate hypochromia (MCHC < 32%) from normochromia (MCHC ≥ 32%). It is less interesting than the TCMH.

The rate of reticulocytes which affirms the character:

- Central with a rate of reticulocytes <120,000/mm³: non-regenerative anemias.
- Peripheral anemia with a reticulocyte count ≥ 120,000/mm³): regenerative anemias.

The reticulocyte count was requested in patients with normocytic or normochromic macrocytic anemia.

The myelogram was requested in patients with normocytic or non-regenerative macrocytic anemia after ruling out vitamin B12 or iron deficiency.

A iron balance based on the determination of ferritinemia was requested in patients with hypochromic microcytic anemia but also in certain patients with normocytic normochromic aregenerative.

Inflammatory assessment (CRP) has been indicated in patients with hypochromic microcytic anemia with normal or elevated ferritin levels and in some patients with aregenerative normochromic normocytic anemia.

A vitamin assay (Vit B12 and Vit B9 assay) was performed in patients with aregenerative macrocytic anemia. This assay made it possible to diagnose a vitamin deficiency as follows:

- **Vitamin B12 Deficiency:** Vitamin B12 level < 200 ug/L.
- **Folate Deficiency:** Folate levels < 5 ug/L).

A haemolysis assessment (EG, bilirubin, LDH and haptoglobin) was performed in patients with regenerative normochromic normocytic anemia and in patients with microcytic anemia with a normal ferritin level without inflammatory syndrome.

Coombs test was performed in all patients with autoimmune hemolytic anemia.

The degree of anemia was assessed as follows:

- **Severe Anemia:** Hemoglobin level ≤ 6.99g/dl,
- **Moderate Anemia:** Hemoglobin level between 7 and 9.99 g/dl,
- **Mild Anemia:** Hemoglobin level between 10 and 11.99 g/dl in women and 10- 12.99 g/dl in men.

The data was collected on pre-established survey sheets, entered into Microsoft Word 2007 and Excel 2013 and analyzed using Epi Info software.

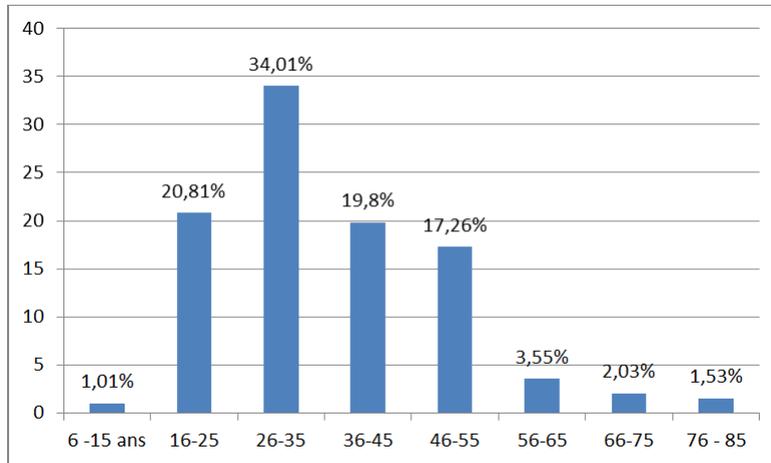
Information collected from patient records was completely confidential and used for research purposes.

RESULTS

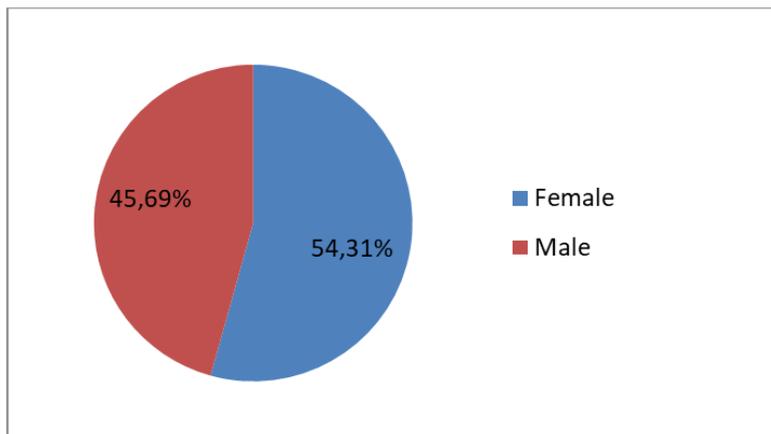
We identified 197 cases of anemia out of 1883 patients admitted to the Unit, that is a hospital prevalence of 10.46%.

The age group of 26 to 35 years was the most represented in 67 cases (34.01%) followed by the age group of 16-25 years 41 cases (20.81%) (See graphique 1) with as average age 25 years. The female sex was predominant, 107 cases (54.31%) with a sex ratio of 0.84 (See graphique 2). Housewives were the largest group with 104 cases (52.8%) (See Table 1). The majority of patients lived in rural areas 48 cases

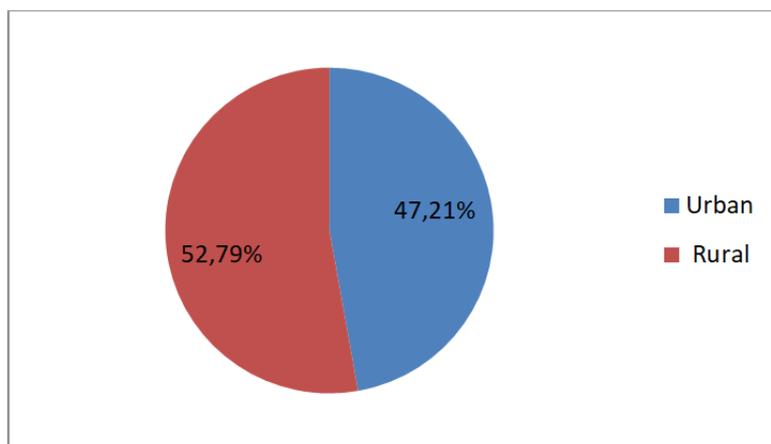
(52.75%) (See graphique 3). Gastropathy was the most found antecedent 76 cases (38.58%) followed by hypertension 53 cases (26.90%); 121 patients (61.42%) had no history (See Table 2). The main clinical manifestations were: conjunctival pallor 118 cases (59.9%), vertigo 112 cases (56.85%), physical asthenia 109 cases (55.33%), dyspnea 101 cases (51.26 %), headaches 99 cases (50.25%) (See Table 3).



Graphique 1: Distribution of patients according to age



Graphique 2: Distribution of patients by gender



Graphique 3: Distribution of patients by place of residence

Table 1: Distribution of patients by profession

Occupation	Workforce	Percentage (%)
Housewife	104	52,8
Cultivator	53	26,9
Shopkeeper	13	6,6
Saleswoman	10	5,07
Shepherd	7	3,56
Worker	5	2,54
Gold panning	3	1,52
Breeder	2	1,01
Total	197	100

Table 2: Distribution of patients according to history

Medical background	Workforce	Percentage (%)
Gastropathy	76	38,58
High blood pressure	53	26,90
Diabetes	5	2,53
HIV	6	3,04
Chronic renal failure	4	2,03
Heart failure	3	1,52
Hemorrhoid	6	3,04
Drop	1	0,5
Emphysema	1	0,5
Autoimmune disease	4	2,03
Cirrhosis	4	2,03
Carcinoma hepatocellular	2	1,01
Prostate adenoma	3	1,52
Stroke	1	0,5
Hyperthyroidism	2	1,01
Inguinal hernia	2	1,01
Appendectomy	5	2,53
Caesarean section	7	3,55
Fibroid	4	2,03
No history	121	61,42

Table 3: Distribution of patients according to clinical signs

Clinical signs	Workforce	Percentage (%)
Conjunctival pallor	118	59,9
Vertigo	112	56,85
Asthenia	109	55,33
Dyspnea on exertion	101	51,26
Headaches	99	50,25
Palpitations	90	45,68
Tachycardia	90	45,68
Abdominal pain	88	44,67
Bloating	79	40,10
Constipation	105	53,3
Geophagy	17	9,63
Dysphagia	55	27,92
Systolic murmur	18	9,13
Lower limb edema	14	7,10
Perleche	7	3,55
Koilonychie	13	6,59

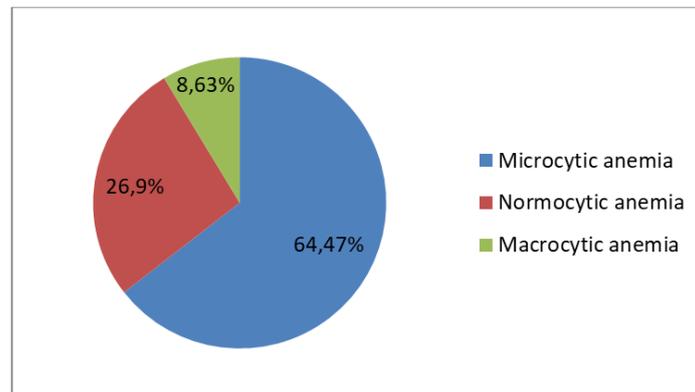
The associated pathologies were: hypertension 76 cases (38.58%) followed by malnutrition 67 cases (34.01%) (See Table 4).

Table 4: Distribution of patients according to associated pathologies

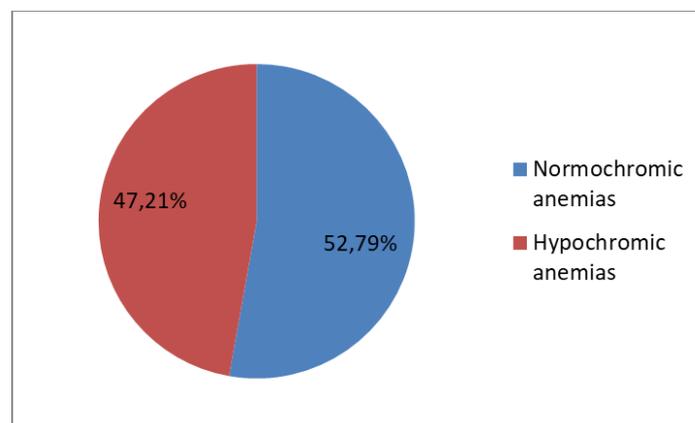
Associated pathologies	Workforce	Percentage (%)
High blood pressure	76	38,58
Malnutrition (anorexia)	67	34,01
Gastropathy	53	26,90
Bacterial pneumonitis	27	14,21
HIV	6	3,04
Chronic renal failure	4	2,03
Hemoglobinopathy	4	2,03
Pulmonary tuberculosis	2	1,01
Abundant/prolonged rule	33	16,75
Postpartum hemorrhage	3	1,52
Meadow heart disease	3	1,52
Autoimmune diseases	4	2,03
Malaria	3	1,52
Diabetes	5	2,54
Chronic liver disease	6	3,04
Hematological malignancies	5	2,54
Pleurisy	7	3,55
Urinary tract infection	11	5,58
Gastroenteritis	8	4,06
Intestinal parasitosis	19	9,64

Biologically, microcytic anemia was the most frequent 127 cases (64.47%), followed by normocytic

anemia 53 cases (26.90%) and macrocytic anemia 17 cases (8.63%) (See graphique 4).

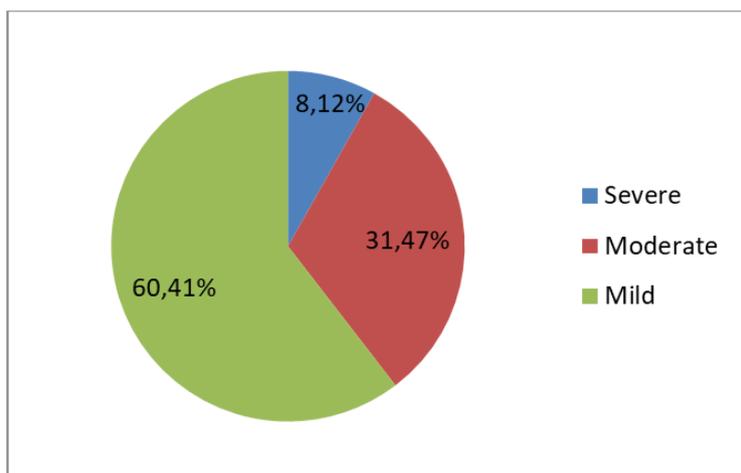
**Graphique 4: Distribution of patients according to MCV**

Normochromic anemia was more encountered in 104 cases (52, 79%) compared to anemia hypochromic 93 cases (47.21%) (See graphique 5).

**Graphique 5: Distribution of patients according to TCMH**

Depending on the severity, mild anemia was more frequent in 119 cases (60.41%) followed by

moderate anemia in 62 cases (31.47%). Anemia was severe in 16 cases (8.12%) (See graphique 6).



Graphique 6: Distribution of patients according to degree of anemia

The main etiologies of anemia were iron deficiency in 98 cases (49.75%) followed by infections

(anemia of inflammatory origin) in 73 cases (30.06%) (See Table 5).

Table 5: Distribution of patients according to etiology

Etiologies		Workforce	Percentage (%)
Iron deficiency		98	49,75
infections (N= 73)	Bacterial pleuropneumonia	24	30,06%
	Probable intestinal parasitosis	17	
	Malaria	11	
	VIH	7	
	Soft tissue infection	7	
	Urinary tract infection	4	
	Pulmonary tuberculosis	3	
Chronic Kidney Failure		7	3,55
Autoimmune diseases		6	3,05
Neoplasias		3	1,52
Vitamin B12 deficiency		3	1,52
Chronic liver disease		3	1,52
Hematological malignancies		2	1,02
Folic acid deficiency		2	1,02
Total		197	100

The outcome was favorable in 187 patients (94.92%), the lethality linked to anemia was 1.02% (See Table 6).

Table 6: Distribution of patients according to progression

Evolution	Workforce	Percentage (%)
Favorable	187	94,92
Out of sigh	5	2,54
Referred to Bamako	3	1,52
deceased	2	1,02
Total	197	100

DISCUSSION

In our series, we found a hospital prevalence of 10.46%. Marie-chantal Ngonde-Essome *et al.*, [4] in her study on anemia and associated pathologies in the general medicine department of the Yaoundé university hospital center had found a prevalence of 20.94%,

Hoahy Rasoanandrasana [5] during of a prospective descriptive study of the anemias encountered at the Hematology UPFR of the Joseph Ravoahangy Andrianavalona University Hospital Center in Antananarivo had found a prevalence of 31.66 Ayoub bouhmou *et al.*, [6] during a 5-year retrospective study

in Morocco had identified cases of anemia in years. Ali Zinebi *et al.*, [7] reported 150 cases of anemia in 5 years relating to the etiological profile of anemia in an internal medicine department at the Moulay Ismail military hospital in Meknes.

The age group of 26 to 35 years was more represented 31.87% in our study. For Ngonde-Essome *et al.*, [4], those under 26 represented the age group most affected by anemia (6.50%) followed by the 26-36 age group (4.25 %). Hoahy Rasoanandrasana [5] found a predominance of anemia in the age group of (45-60) years (20.25%), followed by people aged over 60 (18.24%). Ayoub bouhmou *et al.*, [6] observed a high frequency in the 56-70 age group.

The average age of our patients was 25 years old in our study. For Ngonde-Essome *et al.*, [4], the average age of patients in the study was 35 ± 7.2 years. Hoahy Rasoanandrasana [5] had found an average age of 38 years with extremes of 1 day to 96 years. Ayoub bouhmou *et al.*, [6] had found the average age to be 48.4 years. Ali Zinebi *et al.*, [7] reported an average age of 48.8 years.

The female sex was predominant, 54.31% in our series. Ngonde-Essome *et al.*, [4] had found a prevalence of anemia of 16.68% in women and 4.25% in men. For Hoahy Rasoanandrasana [5], the study population consisted of 671 women and 796 men, with a sex ratio of 1.18. Ayoub bouhmou *et al.*, [6] had found 64% of women with a sex ratio F/M of 1.78. For Ali Zinebi *et al.*, [7] the female predominance was noted in 62.37% with a sex ration of 1.78.

Housewives were the largest occupational group with 52.8%. Ngonde-Essome *et al.*, [4] found that students were more anemic (8.40%) followed by workers (6.71%) and housewives (5.83%).

In our study 52.75% of our patients came from rural areas while 47.25% came from urban areas. In the study by El Hioui [8] 61% of patients came from particularly unfavorable socio-economic backgrounds of rural origin, while 39% of patients came from urban areas.

Gastropathy was the most found antecedent 38.58% followed by hypertension 26.90% in our series. For Ayoub bouhmou *et al.*, [6] the most found antecedent was diabetes with 15 cases.

In our study the main clinical manifestations were: conjunctival pallor 59.9%, vertigo 56.85%, physical asthenia 55.33%, dyspnea 51.26 %, headaches 50.25%. Ayoub Bouhmou *et al.*, [6] found mucocutaneous pallor 123/150, asthenia 110/150, tachycardia 97/150, vertigo 85/150, palpitation 70/150, dyspnoea 35/150.

In our study, the associated pathologies were: hypertension 38.58%, followed by malnutrition 34.01%.

The average hemoglobin level in our series was 8.18 g/dl. Ayoub bouhmou *et al.*, [6] had found an average hemoglobin level of 8 g/dl. For Ali Zinebi *et al.*, [7] the average hemoglobin level was 8 g/dl with extremes ranging from 3.4 to 11.4 g/dl.

Biologically, microcytic anemia was the most frequent 64.47%, followed by normocytic anemia 26.90% and macrocytic anemia 8.63% in our study. Hoahy Rasoanandrasana [5] had found that normocytic anemia was predominant in the order of 64.01%, followed by microcytic anemia 32.11% and macrocytic anemia 3.89%. Ayoub bouhmou *et al.*, [6] reported 56% microcytic anemia; 23% macrocytic anemia, and 21% normocytic anemia. For Ali Zinebi *et al.*, [7] microcytic anemia was more represented in 56% of cases.

Normochromic anemia was more encountered in 52, 79% compared to anemia hypochromic 47.21% in our series. Hoahy Rasoanandrasana [5] found that normochromic anemia constituted 61.76%. Ayoub bouhmou *et al.*, [6] found 67% normochromic anemia and 33% hypochromic anemia.

In our study mild anemia was more frequent 60.41% followed by moderate anemia 31.47% and anemia was severe 8.12%. Ngonde-Essome *et al.*, [4] found 10.07% mild anemia and 0.45% severe anemia. For Hoahy Rasoanandrasana [5], reported 43.22% mild anemia, 33.88% moderate anemia; 15.06% fairly severe anemia and 7.84% severe anemia. Ayoub Bouhmou *et al.*, [6] found 26% mild anemia, 26.6% moderate anemia; 27.3% fairly severe anemia and 20% severe anemia. Ali Zinebi *et al.*, [7] found 20% severe anemia with an Hb level of less than 6 g/dl.

In our study, the main etiologies of anemia were iron deficiency with a prevalence of 49.75% followed by infections (inflammation) 30.06%. In the study by Ali Zinebi *et al.*, [7] iron deficiency anemia was the dominant etiological diagnosis in 60% of cases, followed by megaloblastic anemia observed in 21% of patients and then hemolytic anemia in 7.33% of cases.

During our study, the evolution was favorable in 187 patients (94.92%), the lethality linked to anemia was 1.02%. ZORE S [5] found 56.16% normal evolution and 14.89% death. Faye A *et al.*, [4] found 23% of patients died.

CONCLUSION

Anemia remains a frequent, multidisciplinary pathology. It is common in young adult female subjects and subjects living in an unfavorable socioeconomic context. Microcytic and normocytic anemias were the most common types of anemia encountered on

outpatients in the Internal Medicine Unit. Our work has made it possible to know the different etiologies of anemia dominated by iron deficiency.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this paper.

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