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Review Article

Prevalence of Obesity and its Association with Undiagnosed Type 2 Diabetes Mellitus among Adults in Africa: A Rapid Scoping Review

Collins C. Ihichukwu[1], Monica N. Nnamani[1*], Eustace C. Egere[1], Brian O. Ogbonna[2], Azuka C. Oparah[3]

[1]Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, Madonna University Elele, Rivers State; [2]Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, David Umahi Federal University of Health Sciences, Uburu, Ebonyi State; [3]Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Benin, Benin City, Edo State.
Correspondence: nnamanimonicannenna@madonnauniversity.edu.ng; Tel: +2348184756705

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Abstract

Africa carries a rising dual burden of obesity and type 2 diabetes mellitus (T2DM), with the highest proportion of undiagnosed diabetes of any world region. This rapid scoping review, reported according to PRISMA-ScR, mapped evidence on obesity prevalence and its association with undiagnosed T2DM among African adults. ScienceDirect, PubMed, Google Scholar and African Journals Online were searched for studies published from January 2000 to December 2025. Of 526 records, 128 met the eligibility criteria, and a purposively prioritized subset of 18 studies was fully extracted and verified (OSF: https://osf.io/ujph5); 16 were data-bearing and covered eleven countries in all five African sub-regions. Obesity prevalence ranged from 4.5% (Democratic Republic of Congo occupational cohort) to 33.9% (urban Ghanaian women), and every multi-site study showed a rural-to-urban gradient that was largest in absolute terms among women. In three studies with comparable screen-detected estimates (Cameroon, Egypt, Ethiopia), undiagnosed T2DM prevalence ranged from 3.1% to 5.1%, while a national survey in Mozambique and a survey of the Nairobi slums found that most diabetes was undiagnosed. Studies published between 2023 and 2026 were consistent: 36% to 61% of diabetes detected at screening was previously undiagnosed, and overweight and obesity were associated with roughly 1.5- to 2-fold higher odds of diabetes. Opportunistic glucose screening triggered by obesity or hypertension and integrated into existing non-communicable disease, HIV and community pharmacy services, prioritizing urban women without neglecting rural communities, is needed to close this diagnostic gap.

Keywords: obesity; type 2 diabetes; undiagnosed diabetes; Africa; scoping review; rural-urban gradient; non-communicable disease

Introduction

Africa is undergoing a rapid epidemiological transition in which non-communicable diseases (NCDs), particularly obesity and type 2 diabetes mellitus (T2DM), are overtaking infectious disease and undernutrition as causes of morbidity and premature death [1,2]. Between 1990 and 2021, the age-standardized prevalence of T2DM in the African region roughly doubled [1]. The International Diabetes Federation (IDF) estimates that 25 million African adults had diabetes in 2024, a figure projected to reach 60 million by 2050, the largest proportional increase of any region. It also estimates that 73% of these cases are undiagnosed, the highest proportion globally [3]. This gap reflects limited laboratory capacity, low screening coverage, primary care workforce shortages, and the largely asymptomatic early course of T2DM [4,5].

Excess adiposity, particularly visceral fat, promotes insulin resistance and progressive beta-cell dysfunction and is the principal modifiable risk factor for T2DM. Less well characterized is its population-level relationship with undiagnosed T2DM, the group at greatest immediate risk of complications because it is not receiving care [4]. Only about half of adults with diabetes in four sub-Saharan African countries were aware of their condition [6], and 49.7% of cases among older

adults in The Gambia, South Africa and Zimbabwe were undiagnosed [7]. Pooled estimates place undiagnosed diabetes at 8.68% in urban and 3.93% in rural African populations [8].

Urbanisation is a consistent driver of obesity. The RODAM study showed obesity rising from 8.3% among rural to 33.9% among urban Ghanaian women [9], and urban women in Ghana's 2022 Demographic and Health Survey still had twice the odds of obesity of rural women [10]. African diabetes is nevertheless heterogeneous: Ethiopian patients are often younger and leaner than Nigerian patients [11], and structured clinical phenotyping has been proposed to improve diagnosis [12]. Estimates also vary by diagnostic method, sampling frame and obesity cut-off, and a Nigerian meta-analysis of 60 studies reported a pooled T2DM prevalence of 7.0%, with zonal estimates from 2.0% to 11.4% [13]. A verified synthesis is needed to separate genuine regional patterns from methodological artefacts. This rapid scoping review therefore mapped the prevalence of obesity among African adults and its association with undiagnosed T2DM, with attention to sub-regional and rural-urban variation.

Methods

Study design and scope

This rapid scoping review was reported according to the PRISMA extension for Scoping Reviews (PRISMA-ScR) [14] and conducted following the JBI methodology for scoping reviews [15]. The conduct was modified to a rapid format with purposive prioritisation of studies for extraction, in line with Cochrane rapid review guidance [16]. The review was registered on the Open Science Framework (https://osf.io/ujph5).

Eligibility criteria

Studies were eligible if they were primary observational studies (cross-sectional, cohort, case-control or national surveys) of adults aged 18 years or older living in an African country, conducted in any community or health care setting, and published in English between January 2000 and December 2025. They also had to report the prevalence of overweight (body mass index [BMI] of 25 kg/m² or more), obesity (BMI of 30 kg/m² or more) or central adiposity, and/or the prevalence of, or risk factors for, undiagnosed T2DM. Studies of children and adolescents, of migrant or diaspora populations outside Africa, and of populations restricted to previously diagnosed diabetes without an undiagnosed or prevalence component were excluded, as were secondary designs, editorials, protocols, conference abstracts and animal studies.

Search strategy

ScienceDirect, PubMed, Google Scholar and African Journals Online (AJOL) were searched using Boolean combinations of obesity terms (obesity, overweight, body mass index, waist circumference, adiposity), diabetes terms (type 2 diabetes, undiagnosed diabetes, impaired fasting glucose, hyperglycaemia) and geographic terms (Africa, sub-Saharan Africa and the 54 African countries), adapted to each database. AJOL was included because much African research is not consistently indexed in PubMed. Reference lists of key studies were hand-searched. An updated PubMed and AJOL search for publications from 2023 to 2026 was run during revision; these studies were used for comparison only and were not added to the extracted set.

Study selection

Two reviewers independently screened titles and abstracts and then full texts, resolving disagreements by discussion or, where necessary, by a third reviewer. After removal of 19 duplicates, 507 records were screened and 290 were excluded. Of 217 full texts assessed, 18 were excluded at full-text screening and 71 of the remaining 199 were excluded after verification, leaving 128 eligible studies (**Figure 1**). This total reflects an audit of initial screening decisions that reclassified 38 records to exclude and 62 to include. Eighteen studies were then selected for full extraction using pre-specified criteria applied in order: representation of at least two to three studies per sub-region; inclusion of all studies reporting undiagnosed T2DM separately from total diabetes; inclusion of all national or multi-site population surveys; and allocation of any remaining places to maximise country diversity.

Data extraction and quality appraisal

A structured form captured study characteristics, obesity measures and prevalence, diabetes screening method, undiagnosed T2DM prevalence and measures of association, and every entry was verified against the full text. Quality was appraised with the eight-item JBI checklist for analytical cross-sectional studies and rated high (seven or more criteria met), moderate (five or six) or low (fewer than five). No study was excluded on quality grounds.

Data synthesis

Findings were synthesised narratively by sub-region and by urban or rural setting. Because of population and methodological heterogeneity, no meta-analysis was performed.

Results and Discussion

Characteristics of included studies

Eighteen studies were extracted and verified **(Table 1)**. Sixteen were data-bearing and covered eleven countries: West Africa (Ghana, Burkina Faso and Nigeria; five studies), North Africa (Egypt; one), East Africa (Ethiopia and Kenya; two), Central Africa (Cameroon and the Democratic Republic of Congo; three studies from two cohorts) and Southern Africa (Malawi, Mozambique and South Africa; five). Two studies from Algeria and Ghana were excluded for outcome mismatch but are shown for transparency. Ten data-bearing studies were rated high and six moderate quality.

Obesity prevalence and the rural-urban gradient

Obesity prevalence varied more with sampling frame than with geography. In West Africa it ranged from 4.84% in a largely rural countrywide sample in Burkina Faso [19] to 33.9% among urban Ghanaian women [9], with 11.9% in urban Jos, Nigeria [26]. Female obesity in Malawi was 13% overall and 18% in urban Lilongwe [17]. An urban Cameroonian sample recorded 64.2% combined overweight and obesity [18], the highest in this review, and 27.8% of adults in Jimma, Ethiopia, were overweight or obese [21]. The Congolese mining workforce had a baseline obesity prevalence of 4.5% that rose to 11.1% within five years [24,25], a reminder that occupational and community samples are not directly comparable. The South African studies [27-29] and the single Egyptian study [20] focused on glycaemia and did not report comparable obesity estimates, leaving North Africa under-represented.

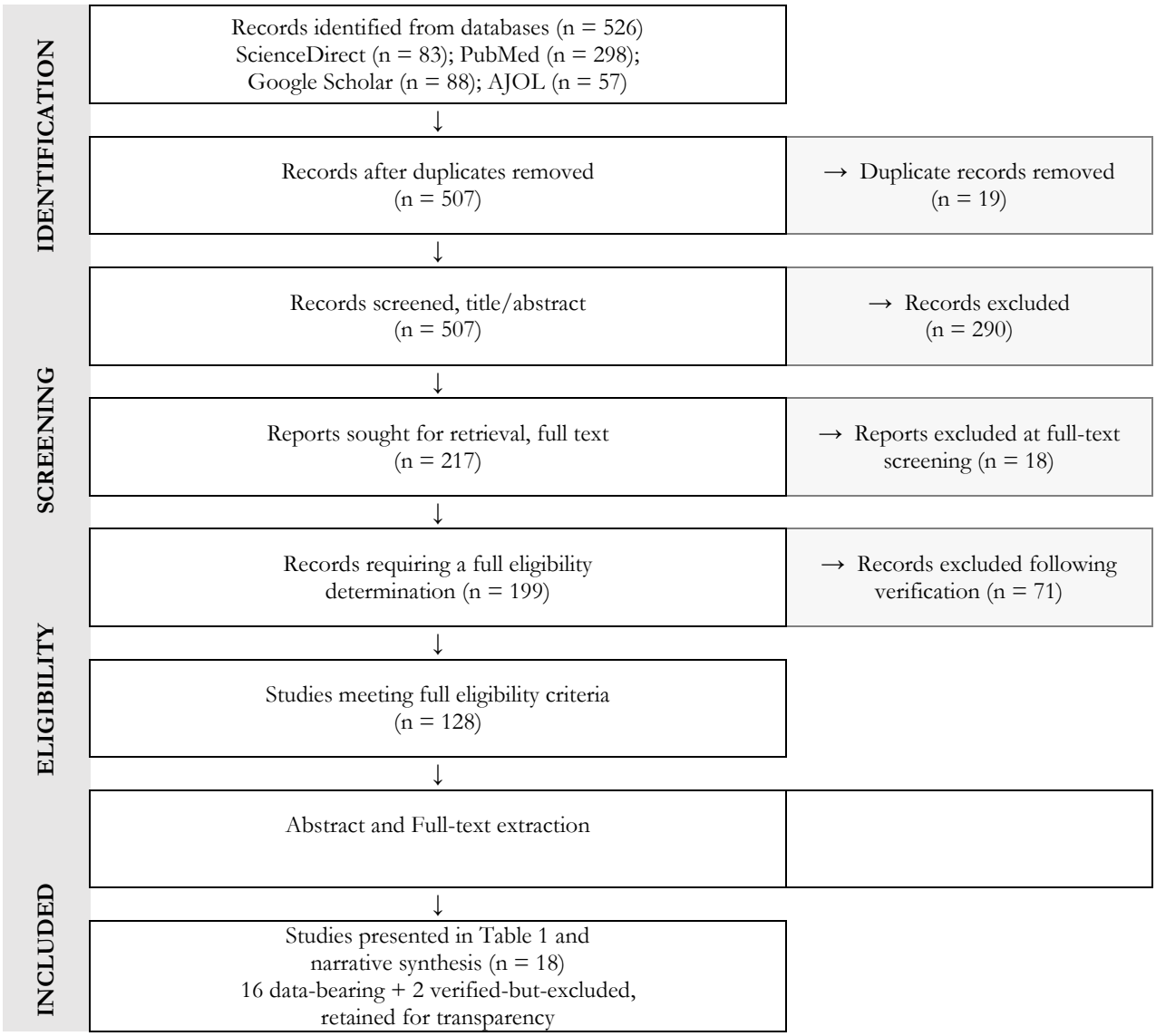

Figure 1. Flow diagram of study identification, screening, verification and prioritized inclusion

Table 1: Characteristics and findings of included studies

No	Study	Country (Sub-region)	N	Design	Obesity Prevalence	Diabetes or Undiagnosed T2DM	JBI Quality
1	Agyemang et al. [9] (RODAM)	Ghana (West)	5,659	Multi-site cross-sectional	Rural M1.3%,F8.3%; Urban M6.9%,F33.9%	Not distinguished by diagnosis status	High
2	Price et al. [17]	Malawi (Southern)	28,891	Population-based survey (rural and urban)	Women 13% nat'l,18% urban	Combined diagnosed+undiagnosed only	High
3	Echouffo-Tcheugui et al. [18]	Cameroon (Central)	2,120	Community cross-sectional	64.2% overweight/obese	4.6%(M) ,5.1%(F) undiagnosed	High
4	Kaboré et al. [19]	Burkina Faso (West)	4,800	Countrywide cross-sectional	13.82% overweight, 4.84% obese	Not reported	High
5	Farag et al. [20]	Egypt (North)	719 (excl. known	Household survey	Not primary focus	5% undiagnosed; 21.7% pre-diabetes	Moderate

			diabetics)				
6	Tesfaye Yunka et al. [21]	Ethiopia (East)	915 (excl. known diabetics)	Cross-sectional	27.8% overweight,obese	3.1% undiagnosed (95% CI 2.0-4.4)	High
7	Gatimu et al. [22]	Ghana (West)	4,135 (age 50+)	SAGE survey	Obesity AOR 4.81 (women)	3.95% (self-report)	Moderate
8	Silva-Matos et al. [23]	Mozambique (Southern)	3,323	National STEPS	Not primary focus	87% of diabetics undiagnosed (13.3% aware)	High
9	Mawaw et al. [24]	DR Congo (Central)	2,749	Occupational cross-sectional (2010)	4.5%	11.7% diabetes	High
10	Mawaw et al. [25]	DR Congo (Central)	2,749 (5-yr follow-up)	Occupational cross-sectional trend	4.5% to 11.1% (2010-2015)	11.9% to 15.6% diabetes	High
11	Puepet et al. [26]	Nigeria Jos (West)	Community sample	Cross-sectional	11.9% obese	Not diabetes-focused	Moderate
12	Grundlingh et al. [27]	South Africa (Southern)	National assessment	Cross-sectional	Not primary focus	Diabetes/pre-diabetes risk factors assessed	Moderate
13	Motala et al. [28]	South Africa (Southern)	1,025 (78.9% response)	Rural cross-sectional (OGTT)	Not obesity-focused	3.9% diabetes (age-adjusted)	High
14	Erasmus et al. [29]	South Africa Bellville-South (Southern)	Community sample	Cross-sectional (diagnostic comparison)	Reported	FPG ~36% more sensitive than 2-hr glucose	Moderate
15	Egbi & Ahmed [30]	Nigeria South-South (West)	Rural agrarian community	Cross-sectional	Reported	Diabetes prevalence reported	Moderate
16	Oti et al. [31] (Nairobi slums study)	Kenya (East)	Weighted survey sample	Cross-sectional	Not primary focus	4.8%(F), 4.0%(M); <25% diabetics aware	High
17	Diaf et al. [32]	Algeria (North)	237	Cross-sectional	N/A	N/A	EXCLUDED - outcome mismatch (diagnosed cohort, lipid ratio outcome)
18	Ephraim et al. [33]	Ghana (West)	310	Cross-sectional	N/A	N/A	EXCLUDED - outcome mismatch (diagnosed cohort, eGFR outcome)

Recent studies indicate continuing increases: obesity reached 35.1% and central obesity 74.5% in an urban-poor district of Accra [34], 40.3% of adults screened in Ouagadougou were abdominally obese [35], and 24.5% of peri-urban adults in Blantyre, Malawi, were obese [36]. In Nigeria, obesity coexists with hypertension and T2DM [37] and is documented even among university students [38].

Every multi-site study showed a rural-to-urban gradient. In RODAM, obesity rose 5.3-fold among men (1.3% to 6.9%) and 4.1-fold among women (8.3% to 33.9%) [9]. The relative rise was larger in men, but the absolute rise was more than four times larger in women (25.6 versus 5.6 percentage points). Urban residence was independently associated with overweight or obesity in both sexes in Burkina Faso [19], and the gradient persisted in Ghana in 2022 (adjusted odds ratio [AOR] 2.00) [10]. These patterns are consistent with sedentary urban employment, reduced physical activity and dietary transition [2], and suggest that obesity prevention may be targeted most efficiently at urban women. The gradient is less uniform for dysglycaemia. Although pooled undiagnosed diabetes is about twice as common in urban as in rural populations [8], undiagnosed diabetes in Cape Coast, Ghana, was highest in rural communities [39], and the highest diabetes prevalence among older adults in three countries was in rural South Africa (19.4%) [7]. Screening should therefore not be confined to cities.

Undiagnosed T2DM

Seven included studies reported data relevant to undiagnosed T2DM. In the three with comparable screen-detected general-population estimates, prevalence was 4.6% in men and 5.1% in women in Cameroon [18], 5.0% in Egypt [20] and 3.1% in Ethiopia [21]. This narrow range across three sub-regions and health systems suggests a genuine regional pattern. In Mozambique, 87% of people with diabetes were unaware of their diagnosis [23], and in the Nairobi slums fewer than a quarter were aware [31]. The Congolese cohort and the Ghanaian SAGE survey reported total rather than undiagnosed diabetes (11.9% to 15.6% and 3.95%, respectively) [22,25], and the self-reported SAGE figure understates the true burden.

Recent studies agree. Newly diagnosed diabetes was found in 3.4% to 4.0% of community participants in Ethiopia and Nigeria [11], 4.5% of adults in Debre Tabor, Ethiopia [40], and 3.84% of adults in Cape Coast [39]. Previously undiagnosed cases made up 36.4% of diabetes in rural Uganda [41], 49.7% among older adults in three countries [7] and 61.3% in rural Mali [42], and Tanzania's 2023 STEPS survey provides an updated national estimate [43]. Where adiposity is low, the burden is smaller: in rural Sidama, Ethiopia, where 46% of older adults were undernourished, HbA1c-confirmed undiagnosed diabetes was 1.2% [44]. Among Kenyan hypertensive patients, 5.5% had undiagnosed diabetes [45], making hypertension clinics a high-yield screening point.

The diagnostic test also matters. Fasting plasma glucose (FPG) at 126 mg/dL detected only 44.3% of diabetes identified by oral glucose tolerance testing (OGTT) in Ethiopia and Nigeria [46], and undiagnosed T2DM among Black South Africans was 14% by FPG but 26% by glycated haemoglobin (HbA1c) [47]. Because most included studies used FPG alone, the 3.1-5.1% range is probably conservative.

Obesity-diabetes co-occurrence

The Cameroonian study gives the clearest direct evidence of co-occurrence: 64.2% overweight or obesity alongside 4.6-5.1% undiagnosed T2DM, with about 45% of all diabetes undetected [18]. In the Congolese cohort, obesity more than doubled while diabetes rose to 15.6% over five years [24,25], consistent with a temporal relationship. Recent studies quantify the association: overweight and obesity carried AORs of 1.53 and 2.12 for diabetes among older adults in three countries [7], and of 1.69 and 1.80 in Ouagadougou [35], while abnormal BMI carried an AOR of 6.84 for undiagnosed diabetes in Debre Tabor [40]. A waist-to-hip ratio above 0.9 was among the most consistent markers of high risk across three African populations [48], and central adiposity was associated with diabetes in four countries [6]. Both BMI and waist measures should therefore be used in screening, while lean phenotypes [11,12] mean that a normal BMI should not exclude testing in people with other risk factors.

Implications for health systems and pharmaceutical care

These findings favour integrating opportunistic glucose testing into existing obesity, hypertension and HIV services rather than stand-alone diabetes campaigns. Adding point-of-care screening to COVID-19 vaccination in Johannesburg identified 7.8% of participants as potentially newly diagnosed with diabetes or hypertension [49], and community health workers detected substantial undiagnosed diabetes in rural Uganda [41]. Unmet need for diabetes care remains large, with screening a principal bottleneck and gaps concentrated among poorer adults [5]. Non-invasive tools such as the African Diabetes Risk Score, which identified up to 79% of cases in Black South Africans [47], can focus blood testing on those at highest risk, and occupational health programmes offer a low-cost surveillance channel [25]. Pharmacists and community health workers should routinely measure BMI and waist circumference, offer point-of-care glucose testing to clients with obesity, central adiposity or hypertension, refer positive results for HbA1c or OGTT confirmation, and explain that the absence of a prior diagnosis does not mean the absence of risk.

Limitations of the study

This review verified every included study against its full text, covered all five sub-regions and separated undiagnosed from total diabetes. Nevertheless, the rapid design extracted 18 of 128 eligible studies, so the findings map rather than exhaustively quantify the evidence. The English-language restriction may have excluded Francophone studies, and North Africa and slum-dwelling populations were each represented by a single study. Comparability was limited by differing obesity cut-offs, diagnostic tests (FPG, OGTT, HbA1c and self-report) and sampling frames, and HbA1c-based screening was under-represented. Studies published from 2023 to 2026 were used for comparison without formal extraction or appraisal. Future studies should use confirmed screening, report undiagnosed and total diabetes separately, apply standardised adiposity cut-offs and follow cohorts prospectively.

Conclusion

Across eleven African countries, obesity showed a consistent rural-to-urban gradient, largest in absolute terms among women, and screen-detected undiagnosed T2DM was 3.1-5.1% where comparable methods were used. Recent studies confirm that one-third to nearly two-thirds of diabetes detected at screening was previously undiagnosed and that obesity roughly doubles the odds of diabetes. Glucose screening triggered by obesity or hypertension and integrated into existing NCD, HIV,

occupational and community pharmacy services, prioritising urban women but reaching rural communities, offers a feasible route to closing Africa's diabetes diagnostic gap.

Declarations

Ethical approval
This study is a scoping review of previously published, de-identified aggregate data; formal institutional ethics review board approval was therefore not required.

Informed consent
As this study involved secondary analysis of previously published, de-identified aggregate data only, individual informed consent was not required.

Consent for publication
Not applicable.

Availability of data and materials
Supplementary data relating to the study are available from the corresponding author upon reasonable request.

Competing interests / Conflict of interests
The authors declare that they have no competing interests.

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Authors' Contributions
CCI and MNN: conceptualization and design of the review. MNN and ECE: literature search, screening, and data extraction. CCI and MNN: independent verification of included studies. MNN: writing the original draft. ACO: main supervisor of the study. BOO: co-supervision and critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript.

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During the preparation and revision of this manuscript, the authors used an AI-based writing assistant to support editing, consistency checking, and reference verification in response to reviewer and editorial comments. The authors reviewed, verified, and edited all AI-assisted output and take full responsibility for the content, accuracy, and integrity of this publication.

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