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Orginal Research

An Analysis of the Implementation and Challenges of the 2024 Indonesian Nutrition Status Survey (SSGI) Validation in East Kalimantan Province

Analisis Pelaksanaan dan Tantangan Validasi Survei Status Gizi Indonesia (SSGI) 2024 di Provinsi Kalimantan Timur

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Abstract: *The Indonesian Nutritional Status Survey (SSGI) is a national instrument used to monitor the population's nutritional status and provide evidence for policy formulation. The accuracy of nutritional prevalence estimates depends on the quality of survey implementation and validation. This study aimed to evaluate the validation process of the 2024 SSGI in East Kalimantan Province, specifically in Samarinda City and Penajam Paser Utara District. A descriptive-evaluative design was applied between July and August 2024, involving households and individuals from validation clusters in accordance with the 2024 sampling design. Data were collected through anthropometric measurements, household and individual interviews, field observations, and document reviews, complemented by in-depth interviews with enumerators, validators, and supervisors. Quantitative analysis identified procedural deviations, while qualitative thematic analysis explored challenges related to training, logistics, supervision, and data quality assurance. The results indicated that geographical and accessibility constraints, administrative barriers during sample updating, insufficient technical guidelines, and inconsistent recruitment mechanisms hindered the input stage. At the process stage, deviations were observed in anthropometric measurements, hygiene protocol adherence, and interview completeness, while environmental conditions, limited facilities, and weak coordination influenced the output stage. These findings highlight gaps between standardized protocols and field practices that may compromise data validity. Systemic improvements are needed through updated sampling frames, written technical guidelines, practice-based training, layered supervision, and adaptive implementation strategies to strengthen future national nutrition surveys.*

Key word: anthropometry, data quality, nutrition survey, SSGI, validation

1. INTRODUCTION

The Indonesian Nutritional Status Survey (SSGI) is a strategic national instrument designed to generate population-based nutrition indicators, including the prevalence of stunting, underweight, wasting, and other anthropometric measures, which serve as the foundation for policy formulation and program evaluation at both national and subnational levels (1). The availability of valid and reliable survey data is a prerequisite to ensure that policies are accurately targeted, particularly in relation to stunting reduction, which constitutes a government priority agenda (2). Accordingly, data

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validation mechanisms are established to guarantee that data collection procedures, enumerator competencies, and measurement instruments comply with established scientific and operational standards (3).

In practice, however, the implementation of nutrition surveys and their validation processes are vulnerable to a variety of factors that may compromise data quality. Prior literature and evaluation studies have identified key sources of bias, notably anthropometric measurement errors resulting from non-standardized procedures, such as failing to remove clothing during measurement, using unstable equipment, or recording results without replication. In addition, uneven enumerator training and capacity, administrative failures in updating household lists, and logistical or coordination constraints among stakeholders further affect sample coverage and representativeness (4). These challenges not only reduce the accuracy of nutritional prevalence estimates but also undermine policymakers' trust in the data produced.

Although general guidelines on anthropometric measurement standards and validation procedures are available, empirical evidence on the implementation of these standards in specific contexts, particularly at provincial or district levels with diverse geographical and accessibility conditions, remains limited. In East Kalimantan, for instance, the diversity of settings spanning urban, semi-rural, coastal, and remote areas poses unique challenges in logistics, sample selection, and field protocol adherence. Moreover, the delegation of data updating to external technical providers without rigorous administrative oversight increases the risk of discrepancies between sample lists and actual field conditions. This issue reflects a gap in the accountability chain among policymakers, technical implementers, and field teams (5).

The operational evaluation report that underpins this study identified several concrete findings that may threaten the quality of SSGI data. These include weight and length/height measurements conducted without proper removal of clothing or stabilization of equipment, the absence of consistent disinfection protocols, mid-upper arm circumference (MUAC) assessments performed without marking the midpoint and often in incorrect positions, omission of key questions in household and individual questionnaires, and administrative constraints such as failures in household listing updates and recruitment of supervisors or enumerators who did not meet required standards. These findings are not merely operational descriptions but represent potential sources of systematic bias that could influence prevalence estimates and data-driven policy inferences (6).

The resulting knowledge gaps are twofold. First, there is a lack of comprehensive analysis examining how operational factors interact to affect data quality, including the combined impact of uncalibrated equipment and limited training on measurement variability. Second, there is limited availability of context-specific recommendations tested for feasibility within the unique geographical and administrative conditions of individual provinces, leading to corrective measures that are often generic and less effective. Therefore, an evaluative study is required that not only documents field findings but also analyzes root causes, quantifies their impact on data quality, and formulates operational interventions that are both measurable and applicable at provincial and national scales (7).

This study seeks to address these gaps through an in-depth analysis of the implementation and challenges of the 2024 SSGI validation in East Kalimantan Province. The assessment integrates field validation summaries, procedural

observations, and interviews with technical supervisors and enumerators to identify patterns of deviation from standard anthropometric and interview protocols, evaluate administrative and logistical factors affecting validation, and formulate operational recommendations that are more context-specific. These include capacity-building needs, improved instruments, and enhanced coordination mechanisms aimed at strengthening survey quality in subsequent iterations. The findings are expected to provide useful empirical contributions for public health policymakers, nutrition program planners, and survey implementers in efforts to improve the validity and reliability of nutrition data in Indonesia.

2. METHODS

This study employed a descriptive design with an evaluative approach aimed at analyzing the implementation and challenges of the 2024 Indonesian Nutrition Status Survey (SSGI) validation. The study was conducted in East Kalimantan Province from July to August 2024. The study sample included households and individuals selected from SSGI validation clusters in East Kalimantan, in accordance with the sampling design of the 2024 SSGI survey. The informants consisted of enumerators, technical supervisors (PJT), and household respondents who participated in the validation process. Several clusters in the field did not fully meet the standard sample size (non-standard clusters), particularly in areas with fewer than seven eligible children. To maintain comparability across regions, data from these clusters were retained but treated analytically using proportional weighting based on the actual number of respondents in each cluster, ensuring that the descriptive results still reflected representative field conditions.

The data collected comprised anthropometric measurements (weight, height/length, and mid-upper arm circumference), household and individual interview data, and field notes documenting administrative, logistical, and technical constraints encountered during the validation process. Data collection was conducted through direct observation of measurement and interview procedures, review of validation summary documents, and in-depth interviews with enumerators and PJT. The research instruments included the 2024 SSGI questionnaire, anthropometric tools (digital scales, length boards, microtoises, and MUAC tapes), and the validation guidelines issued by the Indonesian Ministry of Health. Field observations were guided by standardized checklists to record procedural deviations and technical challenges.

Data were analyzed descriptively, focusing on identifying procedural conformity, measurement errors, technical and administrative obstacles, and on-the-ground mitigation strategies. Quantitative data from validation summaries were integrated with qualitative information from observations and interviews to obtain a comprehensive picture of the implementation and challenges of the 2024 SSGI validation in East Kalimantan Province. To address under-represented clusters, weighting adjustments and limited data exclusion criteria were applied to ensure comparability across validation sites. The descriptive-evaluative approach was chosen because it allows the integration of quantitative and qualitative evidence, enabling contextual analysis of procedural deviations. Reliability was ensured through data triangulation (validation summaries, field observations, and in-depth interviews) and cross-checking among researchers during data interpretation.

3. RESULTS

Characteristics of the Validation Sites

The identification results revealed variations in geographical characteristics and accessibility across the census block (CB) sites located in Samarinda City and Penajam Paser Utara (PPU) District. In Samarinda, CB 50304 (Quadrant 1, Pelita Village, Samarinda Ilir) was situated closest to the city center, while CB 50124 (Quadrant 4, Rawa Makmur Village, Palaran) was the most distant site with predominantly rural characteristics. The other two sites, CB 51939 (Quadrant 2, Sungai Pinang Village, Sungai Pinang) and CB 51235 (Quadrant 3, Karang Anyar Village, Sungai Kunjang), were located at intermediate distances from the city center.

In PPU District, the sites exhibited greater diversity. CB 0098 (Quadrant 2, Bangun Mulya Village, Waru) represented a semi-rural area with limited accessibility, while CB 011B (Quadrant 4, Rintik Village, Babulu) was the farthest site, bordering Paser District. CB 041B (Quadrant 3, Waru Village, Waru) was highly remote, accessible only via approximately 20 km of dirt road through oil palm plantations. By contrast, CB 002B (Quadrant 3, Waru Village, Waru) was relatively accessible due to its proximity to the sub-district center. Meanwhile, CB 003B (Quadrant 1, Salo Loang Village), CB 002B (Quadrant 1, Tanjung Tengah Village), and CB 7002B (Quadrant 1, Kampung Baru Village) were coastal sites located near the administrative center of PPU District.

Sampling Process

The sampling process was conducted under the mandate of the Ministry of Health (MoH) in collaboration with a contracted technical provider. In practice, however, administrative challenges emerged during the updating stage, leading to incomplete data revision. Consequently, enumerators had to manually update household information prior to household data collection. In several census blocks (CBs), the number of households with under-five children was fewer than seven. Although this issue had been reported by district and provincial supervisors to the technical provider, no corrective action was taken. As a result, data collection continued in CBs with limited under-five samples. To address the shortage, three additional CBs in Penajam Paser Utara (PPU) District were included in the validation process. Meanwhile, Sepaku Subdistrict was excluded due to financial administrative constraints, and household data collection in this area was conducted only about two weeks after the validation team had completed their activities.

Table 1. Summary of SSGI Validation Results in Samarinda City and Penajam Paser Utara (PPU) District

Location	Subdistrict	Village	CB	Number of Households	Under-five Sample	Completed	Not Completed
Samarinda	Samarinda Ilir	Pelita	50304	10	10	10	0
Samarinda	Palaran	Rawa Makmur	50124	9	9	9	0
Samarinda	Sungai Pinang	Sungai Pinang	51939	9	9	9	0
Samarinda	Sungai Kunjang	Karang Anyar	51235	9	11	9	2
Subtotal Samarinda			**4 CB**	**37**	**39**	**37**	**2**
PPU	Waru	Bangun Mulya	0098	10	10	9	1
PPU	Babulu	Rintik	011B	5	5	5	0
PPU	Waru	Waru	041B	7	7	5	2
PPU	Waru	Waru	002B	2	2	2	0
PPU	Penajam	Salo Loang	003B	5	5	5	0

Location	Subdistrict	Village	CB	Number of Households	Under-five Sample	Completed	Not Completed
PPU	Penajam	Tanjung Tengah	002B	4	4	4	0
PPU	Penajam	Kampung Baru	7002B	6	6	6	0
Subtotal PPU			**7 CB**	**39**	**39**	**36**	**3**
Total			**11 CB**	**76**	**78**	**73**	**5**

*Samarinda: *1 household refused due to accident; 1 household refused due to sudden travel.*
*PPU: *1 household not collected due to parental refusal; 2 households not collected due to relocation outside the enumeration block (EB).*

In Samarinda City, validation was conducted in 4 CBs, covering 37 households and 39 under-five children. Of these, 37 children were successfully assessed, while 2 were not due to respondent refusals (one related to an accident, the other due to sudden travel). In PPU District, validation was carried out in 7 CBs, comprising 39 households and 39 under-five children. Of these, 36 were successfully assessed, while 3 were not (one refusal and two cases of household relocation).

Input Validation

The evaluation highlighted several fundamental weaknesses. First, the technical guidelines provided to supervisors and enumerators consisted only of PowerPoint training materials without an accompanying field protocol manual. Second, while enumerator recruitment considered educational background and prior experience, recruitment of technical supervisors did not follow formal procedures; the contracted technical provider relied solely on recommendations from university lecturers. Third, census blocks with fewer than seven under-five children were still included in the validation without clear resolution guidelines from the technical provider, resulting in inconsistent implementation across sites.

Process Validation

Key findings during the anthropometric measurement stage in Samarinda included: weighing and height measurements conducted without removing children's clothing or accessories; unstable stadiometer use; standing height measurement applied to children under two years old; and MUAC measurement performed without marking the mid-upper arm. Additionally, unstable flooring conditions (e.g., wooden floors shifting during measurement) further compromised accuracy.

In Penajam Paser Utara (PPU), deviations from protocol were identified, such as failure to disinfect measurement tools; enumerators not ensuring that children were free from diapers; tilted stadiometer poles; single rather than repeated measurements; incorrect positioning of the child during MUAC and length assessments; and omission of critical survey questions (e.g., respiratory infections, tuberculosis, pneumonia, sanitation).

Regarding interview procedures, findings in Samarinda revealed that enumerators frequently failed to conduct household observations, skipped key questions, improvised questionnaire items, omitted the use of visual aids, and often rushed the interviews. Similar issues were observed in PPU, compounded by incorrect implementation of dietary recall and a tendency to skip more questions later in the day.

Table 2. Summary of Findings in Anthropometric Measurements, Samarinda City and Penajam Paser Utara (PPU) District

No	Location	Indicator of Findings	No. of Census Blocks	No. of Villages	No. of Subdistricts
1	Samarinda	Weight measurements conducted without removing clothing items such as socks or diapers	3	3	3
2	Samarinda	Height measurements conducted without removing clothing (socks, diapers, jackets), and mothers' hair ties were not removed	3	3	3
3	Samarinda	Height measurement poles were unstable or wobbly	3	3	3
4	Samarinda	No disinfection performed between measurements, or disinfectant accidentally came into contact with the child's face	2	2	2
5	Samarinda	Children under two years of age measured in a standing position	1	1	1
6	Samarinda	Mid-upper arm circumference (MUAC) measured without marking the midpoint with a pen or marker	4	4	4
7	Samarinda	Measurement location unstable (e.g., shifting wooden floor)	2	2	2
8	Samarinda	Failure to utilize all available visual aids during interviews	1	1	1
9	PPU	Measurement tools not disinfected before or after use	4	3	2
10	PPU	Enumerators did not ensure that infants or young children were free from diapers during measurement	4	3	2
11	PPU	Stadiometer poles tilted or unstable, affecting measurement accuracy	5	4	3
12	PPU	Anthropometric measurements conducted only once by enumerators	2	2	2
13	PPU	MUAC measured while children were sitting or with non-relaxed arms	4	4	2
14	PPU	Incorrect head positioning of infants during length measurement	1	1	1
15	PPU	Key survey questions skipped (e.g., ARI, TB, pneumonia, asset ownership, sanitation facilities, septic tanks)	1	1	1
16	PPU	Measurements conducted by a single enumerator without collaborative recording	1	1	1
17	PPU	MUAC midpoint not marked with pen or marker	7	6	3

Table 3. Summary of Findings in Household and Individual Interviews, Samarinda City and Penajam Paser Utara (PPU) District

No	Location	Indicator of Findings	No. of Census Blocks	No. of Villages	No. of Subdistricts
1	Samarinda	Enumerators did not conduct household observations in the questionnaire	4	4	3
2	Samarinda	Enumerators failed to ask several key questions (e.g., TPK, stunting, type of toilet, source of drinking water)	2	2	2
3	Samarinda	Enumerators improvised in the questionnaire, leading to incomplete probing of questions	2	2	2
4	Samarinda	Enumerators did not use the provided tools, such as visual aids and questionnaires	1	1	1
5	Samarinda	Enumerators recorded data from maternal and child health books (KIA) instead of direct digital input	1	1	1
6	Samarinda	Interviews completed too quickly or not following the questionnaire flow properly (10–15 minutes)	2	2	2
7	Samarinda	Enumerators removed mothers' hair ties during measurement instead of requesting mothers to remove them themselves	1	1	1
8	Samarinda	Enumerators made inappropriate remarks about pregnant women's age	1	1	1
9	Samarinda	Replacement households visited because original households were not found or not recognized	1	1	1
10	PPU	No household observations conducted in the questionnaire	7	6	3
11	PPU	Numerous key questions skipped (e.g., stunting, ARI, TB, pneumonia, sanitation facilities, septic tanks)	7	6	3
12	PPU	Dietary recall for infants and mothers not conducted according to standard protocol	4	3	2
13	PPU	No visual aids used during interviews	2	2	2

No	Location	Indicator of Findings	No. of Census Blocks	No. of Villages	No. of Subdistricts
14	PPU	Questionnaires incomplete or not asked in sufficient detail	7	6	3
15	PPU	More questions skipped as interviews were conducted later in the day	2	2	1

Output Validation

Field validators also encountered operational challenges during data collection. In Samarinda, difficulties included unstable wooden floors in several houses, which compromised measurement stability; enumerators lacking infant length boards and borrowing equipment from validators; and the absence of community cadres or neighborhood heads, which delayed household tracing. In Penajam Paser Utara (PPU), challenges comprised rocky, slippery, and steep roads that extended data collection into late evening; difficulty locating mothers of under-five children due to long working hours; and centralized measurements conducted in a single household for multiple children, which created crowding and heightened child anxiety.

Table 4. Challenges Encountered by Validators in Samarinda and Penajam Paser Utara

No	Location	Validator Challenges	No. of Census Blocks	No. of Villages	No. of Subdistricts
1	Samarinda	Several houses had uneven wooden floors, requiring weight/height equipment to be placed outside.	1	1	1
2	Samarinda	Enumerators lacked infant measuring mats and borrowed them from validators.	1	1	1
3	Samarinda	Community cadres only provided directions by phone without accompanying, while neighborhood leaders were absent, delaying household tracing.	1	1	1
4	Samarinda	Wooden house floors were unstable and wobbled during height measurement.	1	1	1
5	PPU	Rocky, slippery, and steep roads slowed data collection, extending into nighttime.	1	1	1
6	PPU	Mothers of under-five children were often absent due to long working hours.	1	1	1
7	PPU	Very long, rocky, and mountainous roads required four-wheel drive vehicles.	1	1	1
8	PPU	Five children were gathered in one household by four cadres, creating crowding and child fear, which hindered measurement.	1	1	1
9	PPU	Household listings (DSRT) categorized the census block as urban, although field conditions were more consistent with rural settings.	1	1	1

4. DISCUSSION

The identification revealed that geographic variation and accessibility of Census Blocks (CBs) in Samarinda City and Penajam Paser Utara (PPU) District significantly influenced the smooth execution of field surveys. These differences are consistent with findings from national health surveys, which emphasize that topography, distance, and transport access are critical determinants of data collection efficiency and the accuracy of anthropometric measurements (8,9). Similar conditions were also reported during the 2021 Indonesia Nutrition Status Survey (SSGI), where difficult geographic access and logistical barriers in eastern provinces were associated with lower response rates and delayed field activities (10).

In Samarinda, CB distribution reflected a spectrum of urban and peri-urban contexts. For example, CB 50304 in Samarinda Ilir, located near the city center, benefitted from better infrastructure and accessibility, facilitating smoother data collection. Conversely, CB 50124 in Palaran represented a semi-rural area with limited access. Such differences align with prior evidence showing that urban–rural contrasts can influence respondent participation, sampling efficiency, and the risk of population underrepresentation (11). Comparable patterns were documented in the 2023 Indonesia Health Survey (SKI) and 2022 SSGI, where urban clusters demonstrated higher data completeness compared to rural and coastal areas, which often faced distance and participation challenges (12,10).

Field conditions in PPU were more heterogeneous and presented greater challenges. Several CBs, such as 0098 (Bangun Mulya) and 041B (Waru), were only accessible after long travel through rocky, slippery, or plantation-dominated terrain. This mirrors findings from rural Central Kalimantan, where transport barriers were identified as a major cause of survey delays and higher non-response rates (13). By contrast, coastal CBs such as 003B (Salo Loang), 002B (Tanjung Tengah), and 7002B (Kampung Baru) were more accessible due to proximity to the district center. Nevertheless, coastal locations carried unique socio-economic challenges distinct from inland areas. These geographic variations not only shaped survey logistics but also introduced potential threats to data validity, as enumerators often worked under fatigue and limited field support (14,15). This aligns with the Ministry of Health's 2022 evaluation of SSGI implementation, which identified infrastructure and communication limitations as key factors affecting data validation timeliness (10).

From a methodological standpoint, the sampling process in East Kalimantan validation sites faced administrative and technical limitations. While formally mandated by the Ministry of Health in collaboration with the contracted technical provider, the household updating process was not fully executed. Consequently, several CBs included fewer than 10 households or fewer than 7 eligible under-five children, conditions that compromise sample validity (16). In the absence of corrective measures, district and provincial supervisors proceeded with data collection. Although pragmatically justified, this decision heightened sampling bias risks, particularly undercoverage of the under-five population (17). According to the *Indonesia Health Survey (SKI) 2023* report, similar issues related to incomplete household lists and mismatched sampling frames were identified in several provinces, highlighting the need for regular data updates and stronger coordination between field teams and central authorities (12,18).

Recapitulatory results indicated different outcomes between Samarinda and PPU. In Samarinda, 37 out of 39 children were successfully interviewed, with only two refusals due to urgent circumstances illustrating fewer technical barriers in accessible urban areas. In PPU, however, three households were not interviewed, one due to migration, a known factor of sample attrition in household surveys (19). The exclusion of Sepaku District for administrative reasons also introduced systematic exclusion that potentially affected representativeness (20). Comparable conditions were described in the 2022 SSGI field report, where household migration and relocation were noted as major causes of sample inconsistencies across provinces (10).

Input-level validation revealed fundamental weaknesses in technical guidance and field support. Survey instructions were provided only as PowerPoint slides without written documentation, leading enumerators to rely heavily on memory from brief training sessions, thus reducing consistency (21). The absence of written protocols

contributed to procedural variation across sites. Enumerator recruitment considered nutrition-related backgrounds, but technical supervisors were selected informally, sometimes resulting in mismatched qualifications (22). Moreover, reports submitted by supervisors concerning clusters with insufficient children received no follow-up, indicating weak feedback mechanisms. Collectively, these issues could undermine the internal and external validity of the survey (23). These findings are consistent with the 2023 SKI supervision report, which emphasized the importance of written manuals, practical training, and stronger feedback systems to ensure inter-regional data consistency (12).

At the process level, technical weaknesses were identified in both anthropometric measurements and interviews. Common measurement errors included weighing children with clothes on, measuring those under two years old in a standing position, using unstable surfaces, and not repeating measurements potentially introducing systematic bias (24). Mid-upper arm circumference (MUAC) measurements often deviated from procedures, such as skipping midpoint marking, which reduced reliability (25). Hygiene protocol adherence was also inconsistent, including inappropriate disinfectant use (26). Interview errors included skipping key questions and overly rapid completion, compromising accuracy; fatigue effects were visible in PPU, where mistakes were more frequent in the afternoon (27). Ethical lapses, such as inadequate respect toward respondents, were also noted (28). These findings are supported by the 2023 SKI training report, which highlighted that structured, practice-based training and tiered supervision helped reduce anthropometric errors and improve data reliability (12).

Output validation revealed that environmental, logistical, and coordination challenges were key obstacles. In Samarinda, many households had unstable wooden floors, forcing height measurements to be conducted outdoors, thereby increasing potential errors (29). In PPU, rocky and steep roads, limited logistics such as unavailable infant mats, and minimal involvement of community health workers posed significant barriers. In cluster 041B, gathering multiple children in a single home created crowding and measurement errors, while misclassification of areas in the Household Sample List introduced sampling risk. These illustrate systemic limitations in logistics, coordination, and socio-cultural adaptation, all affecting data reliability (30). The 2022 SSGI monitoring report similarly noted that logistical constraints, transport access, and limited community participation were major determinants of survey efficiency across Kalimantan and Sulawesi (10).

Overall, weaknesses identified at the input, process, and output stages are interlinked and directly affect nutrition survey data quality. Geographic, administrative, and technical constraints compound these issues by reducing efficiency and representativeness. Systemic improvements are therefore needed, including periodic data updates, written technical manuals, standardized training, multi-level supervision, and region-specific adaptive strategies. These recommendations are consistent with Indonesia’s National Strategy for Stunting Reduction (31), which emphasize strengthening data governance, integrating nutrition surveillance systems, and enhancing cross-sectoral coordination.

5. CONCLUSION

The validation of the SSGI implementation in Samarinda City and Penajam Paser Utara District revealed weaknesses across all stages of the survey, including limited technical

guidelines and inconsistent recruitment, deviations in anthropometric measurements and interviews, and challenges related to physical conditions and coordination. These findings underscore the need to strengthen operational procedures, enhance training quality, and ensure consistent supervision. Practically, this study recommends developing adaptive field manuals, implementing multi-tier supervision, routinely calibrating anthropometric tools, and establishing feedback mechanisms between national and local teams to maintain data quality. The uniqueness of this study lies in its field-based validation using real survey clusters, providing contextual insights rarely captured in national nutrition surveillance research.

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