

DETERMINANTS OF HYPERTENSION RISK FACTORS AMONG THE ELDERLY: A LITERATURE REVIEW

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Abstract

Hypertension among the elderly remains a major public health concern, influenced by various genetic, lifestyle, and psychosocial factors. This study employed a literature review using a descriptive-analytic approach to identify the key risk factors contributing to hypertension in the elderly, based on national and international research findings. The review process followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, with relevant scientific sources retrieved from databases such as Google Scholar, PubMed, and ScienceDirect. The findings of this literature review indicate that the most consistent determinants associated with hypertension in older adults include family history, high salt and fat intake, low physical activity, psychological stress, smoking habits, and obesity. Additionally, age-related physiological changes further increase susceptibility to elevated blood pressure. Overall, hypertension in the elderly is a multifactorial condition requiring integrated promotive and preventive interventions. Preventive efforts should emphasize lifestyle modification, including reduced salt consumption, increased physical activity, smoking cessation, stress management, and maintenance of an ideal body weight.

Keywords: Hypertension; Elderly; Risk Factors; Literature Review; Lifestyle

INTRODUCTION

Hypertension is one of the most prevalent non-communicable diseases and remains a major public health issue worldwide, including in Indonesia. The condition is closely linked to an increased risk of cardiovascular disease, stroke, and chronic kidney failure, contributing significantly to morbidity and mortality among the elderly population. According to the 2024 Indonesia Basic Health Research (RISKESDAS) report, the national prevalence of hypertension reached 35.7%, showing an upward trend compared to previous years, particularly among adults aged 60 years and above. This situation reflects the growing burden of hypertension and its complications in Indonesia's aging society.

The etiology of hypertension in older adults is multifactorial, influenced by both modifiable and non-modifiable factors. Non-modifiable factors include genetic predisposition, age, and family history, while modifiable factors encompass dietary habits, physical activity, smoking, alcohol consumption, and psychosocial stress. Physiological changes in blood vessels and renal function due to aging also contribute to elevated blood pressure levels. These interrelated factors make hypertension management in the elderly population particularly challenging.

Previous studies have shown that unhealthy lifestyle behaviors, such as high salt and fat consumption, lack of exercise, and chronic stress, significantly increase the risk of hypertension among older adults. In addition, socioeconomic disparities and low health literacy levels often exacerbate poor self-management and limited awareness of hypertension prevention. Given the increasing prevalence and complex nature of hypertension among the elderly, it is essential to synthesize existing evidence to identify key risk factors and inform effective preventive strategies. Therefore, this study aims to conduct a systematic literature review to analyze and

summarize the determinants of hypertension in the elderly based on national and international research findings published between 2020 and 2025.

RESEARCH METHODS

This study employed a literature review design with a descriptive-analytic approach to identify, analyze, and synthesize previous research findings regarding risk factors for hypertension among the elderly in Indonesia and internationally. The review process followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological rigor and transparency.

Data sources were obtained from several scientific databases, including Google Scholar, PubMed, ScienceDirect, and DOAJ, covering publications from 2020 to 2025. Keywords used in the search process included “hypertension in the elderly,” “risk factors for hypertension,” “elderly hypertension,” and “determinants of hypertension.”

The inclusion criteria were as follows:

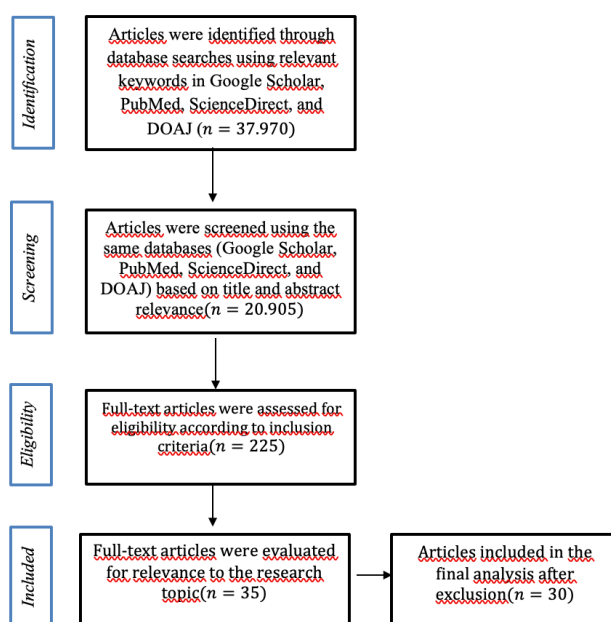
1. Original research articles investigating risk factors of hypertension among the elderly.
2. Studies employing observational analytic designs (cross-sectional, case-control, or cohort).
3. Publications written in English or Indonesian with full-text accessibility.

Exclusion criteria included:

1. Review articles without primary data.
2. Studies involving non-elderly populations (aged below 60 years).
3. Articles lacking statistical analysis or clear presentation of risk factors.

A total of 30 studies initially met the inclusion criteria and were further analyzed. Data extraction included information on authors, year of publication, study design, sample size, instruments used, and key findings. A thematic synthesis approach was applied to identify patterns and consistencies across the studies, highlighting the most influential determinants of hypertension among the elderly.

Gambar 1. PRISMA Literatur Review



RESEARCH RESULTS

The literature search process was conducted following the PRISMA guidelines. An initial total of 37,970 articles were identified from several databases, including Google Scholar, PubMed, ScienceDirect, and DOAJ. After removing duplicates and performing relevance screening based on titles and abstracts, 20,905 studies remained. Following further eligibility assessment according to inclusion and exclusion criteria, 225 full-text articles were reviewed, and 35 studies were found relevant to the research topic. Finally, 30 articles met the inclusion criteria and were included in the synthesis, as presented in the PRISMA flow diagram (Figure 1).

The thirty selected studies were published between 2020 and 2025 and originated from various regions in Indonesia and international contexts. Most studies employed cross-sectional or case-control designs with sample sizes ranging from 50 to 250 respondents. Data collection methods commonly included structured questionnaires, interviews, and direct blood pressure measurements.

Table 1 presents a summary of the reviewed articles, including author names, study titles, objectives, research methods, instruments, and main findings. The studies consistently demonstrated that hypertension among the elderly is associated with multiple risk factors, encompassing biological, behavioral, and psychosocial aspects.

Table 1. Summary of Reviewed Articles (2020–2025)

No	Author(s), Year, Title	Research Objective	Research Method	Research Instrument	Main Findings
1	Nuzulul Rahmi, Faradilla Safitri, Wilda Num Faizin (2023). <i>Determinants of Risk Factors for Hypertension in the Elderly in Ulee Kareng Primary Health Center, Banda Aceh City.</i>	To identify the relationship between nutritional status, dietary patterns, and family history with hypertension among the elderly.	Case-control, 68 samples.	Questionnaire, blood pressure observation.	Family history ($p=0.025$), nutritional status ($p=0.043$), and diet ($p=0.049$) were significant.
2	Sri Marsita, Narmawan, Diah Indriastuti (2020). <i>Risk Factors of Hypertension among the Elderly in Coastal Areas of Abeli Health Center, Kendari City.</i>	To identify hypertension risk factors among elderly people in coastal areas.	Case-control, 118 respondents.	Questionnaire, interview.	Salt intake ($p=0.014$), stress ($p=0.005$), and alcohol consumption ($p=0.000$) were significant.
3	Edy Cahyadi, Fuadi, Valensia Refni Affuan (2022). <i>Factors Associated with Hypertension in the Elderly at Kotabumi II Health Center.</i>	To identify factors associated with hypertension.	Cross-sectional, 84 respondents.	Questionnaire.	Smoking ($p=0.029$) and physical activity ($p=0.018$) were significant.
4	Lusyana Aripa et al. (2024). <i>Factors Associated with Hypertension in the Elderly at Jongaya Health Center, Makassar City.</i>	To identify factors related to hypertension prevalence in the elderly.	Cross-sectional, 64 respondents.	Questionnaire, interview.	Diet ($p=0.031$), physical activity ($p=0.038$), and obesity ($p=0.017$) were significant.

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5	Siti Nuratna Habibah et al. (2023). <i>Factors Associated with Hypertension in the Elderly at Sukadiri Health Center.</i>	To identify risk factors for hypertension among the elderly.	Cross-sectional, 87 respondents.	Questionnaire.	Family history ($p=0.049$) and age ($p=0.042$) were significant.
6	Kristiana Ledoh et al. (2024). <i>Factors Associated with Hypertension in the Elderly (60–74 years).</i>	To analyze the causes of hypertension among elderly individuals.	Case-control, 144 respondents.	Questionnaire.	Physical activity, smoking, alcohol, and coffee consumption were significant.
7	Mastang, Sitti Nurbaya, Mutmainna (2023). <i>Factors Affecting Hypertension Risk among the Elderly.</i>	To assess the relationship between smoking, medication knowledge, and stress.	Cross-sectional, 109 respondents.	Questionnaire.	Smoking ($p=0.037$), medication knowledge ($p=0.034$), and stress ($p=0.025$) were significant.
8	Sutriyawan A. et al. (2022). <i>Risk Factors Predicting Hypertension in the Elderly.</i>	To identify risk factors influencing hypertension in Bandung.	Cross-sectional, 245 respondents.	Questionnaire, observation.	Age, obesity, stress, and family history were dominant (OR=4.2).
9	Febri Gustianda Ginanti Siregar et al. (2024). <i>Analysis of Factors Influencing Hypertension among the Elderly at Rasau Health Center.</i>	To analyze variables contributing to hypertension.	Cross-sectional, 108 respondents.	Questionnaire.	Smoking, obesity, diet, and low physical activity were significant.
10	Janu Purwono et al. (2020). <i>Salt Consumption Pattern and Hypertension among the Elderly.</i>	To determine the relationship between salt intake and hypertension.	Cross-sectional, 51 respondents.	Questionnaire, interview.	Salt intake was significant ($p=0.010$; OR=5.704).
11	Yeni Soraya et al. (2025). <i>Factors Influencing</i>	To analyze factors affecting hypertension among older adults.	Cross-sectional, 176 respondents.	Questionnaire, sphygmomanometer.	Hypertension history, diet, social activity, and mental status were significant.

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	<i>Hypertension among the Elderly.</i>				
12	Imelda, Fidiariani Sjaaf, Puspita P.A.F. (2020). <i>Factors Associated with Hypertension in the Elderly at Air Dingin Health Center.</i>	To identify hypertension risk factors.	Cross-sectional, interviews.	Questionnaire.	Salt, fat intake, and stress were significant.
13	Suwanti et al. (2022). <i>Does BMI or Age Cause Hypertension in the Elderly in Bergas Public Health Center?</i>	To analyze the relationship between BMI, age, and hypertension.	Cross-sectional, 58 respondents.	Medical records, BMI calculator.	Age was significant; BMI was not.
14	Asmarita Hona Nalu et al. (2024). <i>Risk Factors for Hypertension among the Productive Age Group in Kupang.</i>	To determine hypertension risk factors.	Case-control.	Questionnaire.	High-risk diet, obesity, and low activity were significant.
15	Erni Astutik et al. (2021). <i>Differences in Risk Factors for Hypertension among Elderly Women in Indonesia.</i>	To analyze differences in hypertension risk factors among elderly women.	Cross-sectional.	Urine examination, blood pressure.	Urban: sodium & BMI; rural: age.
16	Gibran Wirayudha et al. (2024). <i>Analysis of Risk Factors Contributing to Hypertension in Depok.</i>	To identify risk factors among pre-elderly and elderly individuals.	Cross-sectional, 50 respondents.	Questionnaire.	Nutritional status and sodium intake were significant.
17	Agung Sutriyawan et al. (2022). <i>Risk Factors</i>	To identify predictive factors of hypertension.	Cross-sectional.	Questionnaire, observation.	Stress, obesity, and high salt intake were significant.

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	<i>Predicting Hypertension in the Elderly.</i>				
18	Wahyuni Wahyuni et al. (2024). <i>Factors Associated with Hypertension in the Elderly at Sialang Buah Health Center.</i>	To determine causes of hypertension among elderly individuals.	Cross-sectional, 125 respondents.	Questionnaire, interview.	Salt ($p=0.025$), healthy diet ($p=0.010$), and stress ($p=0.011$) were significant.
19	Azwaldi et al. (2023). <i>Determinant Factors of Hypertension in the Elderly at a Public Health Center in Palembang.</i>	To analyze determinants of hypertension among elderly individuals.	Cross-sectional, 106 respondents.	Questionnaire.	Family history and stress were significant.
20	Dida et al. (2023). <i>Risk Factors of Hypertension among the Elderly in Sikumana PHC.</i>	To analyze diet and physical activity.	Case-control, 100 respondents.	Questionnaire.	Unhealthy diet ($OR=4.45$), low activity ($OR=5.52$) were significant.
21	Johannes Bastira Ginting & Tri Suci (2023). <i>Analysis of Dominant Risk Factors for Hypertension.</i>	To determine dominant risk factors for hypertension.	Secondary analysis.	Medical records.	BMI was the dominant factor.
22	Lumbangaol et al. (2023). <i>Hypertension and Risk Factors: A Case-Control Study.</i>	To examine general risk factors of hypertension.	Case-control.	Questionnaire.	Age, family history, and obesity were significant.
23	Hijrah et al. (2024). <i>Influence of Reinforcing Factors on Hypertension Prevention Behavior.</i>	To analyze hypertension prevention behavior among pre-elderly individuals.	Cross-sectional, 172 respondents.	Questionnaire.	Social support significantly influenced hypertension prevention.

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24	Dewi Nur Khasanah (2022). <i>Risk Factors of Hypertension in Indonesia (IFLS5)</i> .	To analyze national hypertension risk factors.	Secondary data (IFLS5).	National dataset.	Gender, age, physical activity, and obesity were significant.
25	Akbar M.A. (2024). <i>Factors Affecting the Incidence of Hypertension in the Elderly</i> .	To review risk factors for hypertension in the elderly.	Literature review.	Literature sources.	Diet, obesity, and low physical activity were dominant.
26	Mbali M. (2025). <i>Analysis of Factors Related to Hypertension in the Elderly</i> .	To analyze hypertension-related factors in the elderly.	Cross-sectional.	Questionnaire.	Lifestyle and demographic factors had significant effects.
27	Riyada F. (2024). <i>Factors Influencing the Risk of Hypertension (Literature Review)</i> .	To review risk factors of hypertension.	Literature review.	Scientific sources (2020–2024).	Age, salt, stress, obesity, smoking, alcohol were key factors.
28	CARE Journal UNITRI (2025). <i>Risk Factors of Hypertension in the Elderly within the Family</i> .	To review hypertension risks in family contexts.	Literature review.	Local data and references.	Diet, smoking, obesity, and genetic factors were dominant.
29	Utomo A.C. (2024). <i>Systematic Review of Hypertension Risk Factors among the Elderly</i> .	To conduct a systematic review of hypertension risk factors.	Systematic review.	PRISMA-based article selection.	Low physical activity, high salt intake, obesity were significant.
30	<i>Prepotif Journal</i> (2025). <i>Analysis of Hypertension Risk Factors (Literature Review 2020–2024)</i> .	To analyze 20 studies related to elderly hypertension.	Literature review.	Data extraction from selected studies.	Age, salt intake, obesity, stress, and lifestyle factors were significant.

Based on the review of 30 research articles presented in Table 1, it can be concluded that hypertension among the elderly remains a significant public health problem across various regions of Indonesia. Most studies demonstrate a strong association between lifestyle factors, physiological conditions, and social environments with the incidence of hypertension in older adults [1]–[7], [9], [10], [12].

The most dominant risk factors identified include a family history of hypertension, excessive salt intake, obesity, low levels of physical activity, stress, and unhealthy habits such as smoking and alcohol consumption [2], [5], [8], [11], [16], [17], [18], [23], [25]. Furthermore, advancing age is consistently reported as a major determinant of increased blood pressure due to decreased vascular elasticity and reduced renal function [4], [13], [15], [22].

In addition to biological aspects, behavioral and psychosocial components also play crucial roles in the occurrence of hypertension among the elderly. Studies by Mastang et al. [7] and Wahyuni et al. [12] revealed that emotional stress, limited medication knowledge, and lack of social support may exacerbate elevated blood pressure. Similarly, research by Hijrah et al. [29] emphasized that reinforcing factors such as family and community support significantly influence hypertension prevention behaviors.

Several other studies also highlight the influence of dietary habits and physical activity on blood pressure. Ledoh et al. [4] and Aripa et al. [6] demonstrated that diets high in fat and low in fiber, combined with low physical activity levels, significantly increase the risk of hypertension. Similar findings were reported by Dida et al. [28] and Nalu et al. [16], in which sedentary lifestyles and high sodium consumption were identified as key contributing factors. National-level secondary analyses using data from the Indonesian Family Life Survey (IFLS) also support these findings. Alfaqeeh et al. [27] and Khasanah [25] reported that age, socioeconomic status, physical activity, and obesity are major variables contributing to the prevalence of hypertension in Indonesia. Moreover, Widyaningsih et al. [26] highlighted the limited screening of hypertension risk factors in primary healthcare settings, resulting in many undiagnosed cases.

Additionally, several systematic and literature review studies [18]–[21] underscore the importance of non-pharmacological interventions—such as health education, low-sodium diets, regular exercise, and stress management—in reducing hypertension prevalence among the elderly. Family-based approaches were also found to effectively improve adherence to blood pressure control programs [20].

Overall, the reviewed literature confirms that hypertension among the elderly is a multifactorial condition influenced by the interplay of biological, behavioral, and social determinants. Therefore, prevention and control strategies for hypertension in the elderly population should adopt a comprehensive, community- and family-based approach, supported by strengthened roles of healthcare professionals at the primary care level [10], [12], [19], [21], [29], [30].

DISCUSSION

Findings from various studies indicate that multiple interrelated factors—including lifestyle, diet, psychological conditions, genetic predisposition, and demographic as well as social determinants—contribute to the increased risk of hypertension among the elderly. These factors interact to elevate blood pressure and exacerbate cardiovascular health problems in older adults [1], [2], [4], [5], [9], [12].

In the working area of Ulee Kareng Primary Health Center, Banda Aceh, Rahmi et al. [1] found significant associations between hypertension and family history ($p=0.025$), nutritional status ($p=0.043$), and dietary patterns ($p=0.049$). Similarly, Marsita et al. [8] in the

coastal area of Abeli Primary Health Center, Kendari, reported that stress levels ($p=0.005$), salt consumption ($p=0.014$), and alcohol intake ($p=0.000$) were significantly correlated with hypertension. Habibah Nuratna Siti et al. [3] at Sukadiri Primary Health Center, Tangerang Regency, identified significant relationships between age ($p=0.042$) and family history ($p=0.049$) with hypertension, while sex and diet showed no significant associations. Comparable results were found by Ledoh et al. [4] in Kupang, where physical activity ($p=0.000$), smoking ($p=0.007$), alcohol consumption ($p=0.019$), and coffee intake ($p=0.040$) were significantly associated with hypertension among individuals aged 60–74 years.

Mastang et al. [7] identified correlations between smoking habits ($p=0.037$), medication knowledge ($p=0.034$), and stress ($p=0.025$) with the risk of hypertension in the elderly. Supporting these findings, Sutriyawan et al. [9] in Bandung confirmed that age, family history, obesity, physical inactivity, stress, high salt intake, alcohol consumption, and low fiber intake were dominant contributing factors, with an odds ratio (OR) of 4.2.

A. Genetic Factors and Family History

Genetic predisposition remains one of the most consistently reported determinants. Individuals with a family history of hypertension possess genetic tendencies that increase blood pressure regulation abnormalities and vascular reactivity [1], [3], [9], [12], [20]. Rahmi et al. [1] and Habibah Nuratna Siti et al. [3] reported a significant correlation between family history and hypertension among the elderly. Similarly, Utomo [18] emphasized that although genetic factors are non-modifiable, their impact can be mitigated through behavioral and lifestyle modifications.

B. Dietary Factors and Salt Intake

Unhealthy dietary patterns—particularly excessive salt and fat consumption—are major contributors to hypertension among older adults [8], [11], [12], [24]. High sodium intake increases blood volume and vascular pressure. Marsita et al. [8], Imelda et al. [11], and Wahyuni et al. [12] found a significant relationship between salt consumption and hypertension ($p<0.05$). Conversely, Soraya et al. [10] reported that the consumption of potassium-rich fruits and vegetables helps lower blood pressure. Alfaqeeh et al. [27] and Dida et al. [28] further confirmed that low-fiber, high-sodium diets are key contributors to hypertension in Indonesia.

C. Lifestyle Factors: Smoking, Alcohol, and Physical Activity

Unhealthy lifestyles such as smoking, alcohol consumption, and physical inactivity are among the leading modifiable risk factors for hypertension [4], [5], [6], [9], [16], [23], [28]. Cahyadi et al. [5] and Ledoh et al. [4] demonstrated that smoking and alcohol use directly increase blood pressure through vasoconstriction and sympathetic nervous system stimulation. Physical inactivity also elevates hypertension risk by reducing vascular elasticity. Aripa et al. [6] and Hijrah et al. [29] found that individuals with low physical activity levels were significantly more likely to experience hypertension compared to those engaging in regular exercise.

D. Psychological Factors (Stress and Mental Health)

Psychological factors, particularly stress, have been shown to significantly influence hypertension in the elderly. Chronic stress elevates cortisol and adrenaline secretion, leading to sustained increases in blood pressure [7], [9], [11], [12], [19]. Mastang et al. [7] and Wahyuni et al. [12] found a positive association between stress levels and high blood pressure, while Sutriyawan et al. [9] identified stress as the dominant factor with an OR of 4.2. Soraya et al. [10] further emphasized that positive mental health and strong social interaction contribute to better blood pressure regulation through emotional support.

E. Demographic Factors: Age, Sex, and Education

Demographic variables such as age and education also influence hypertension risk. Habibah Nuratna Siti et al. [3] and Suwanti et al. [13] found that increasing age was significantly correlated with higher blood pressure due to declining arterial elasticity. However, findings regarding sex and education remain inconsistent. Khasanah [25] reported that educational attainment contributes to better hypertension prevention behavior, while gender was not a significant predictor.

F. Nutritional Status and Obesity

Both excessive nutritional status (obesity) and specific nutrient deficiencies affect hypertension risk. Aripa et al. [6] and Ginting et al. [24] found that obesity was associated with elevated blood pressure, whereas Wahyuni et al. [12] reported no significant relationship between BMI and hypertension, likely due to differences in respondent characteristics and measurement methods. Other studies also indicated that balanced nutrition with sufficient fiber and micronutrient intake has a protective effect against hypertension [10], [27].

G. Research Implications

This literature synthesis highlights that hypertension in the elderly is a multifactorial and complex condition. While genetic factors are unchangeable, behavioral components—such as diet, physical activity, and stress management—can be modified through community-based interventions. Widyaningsih et al. [26] pointed out the limited implementation of early screening and detection efforts for hypertension in primary healthcare settings. Therefore, prevention programs should prioritize health promotion, education, and regular blood pressure monitoring at the family and primary healthcare levels [18]–[21], [26], [29], [30].

Overall, a comprehensive approach integrating biological, behavioral, and social dimensions is essential to effectively reduce hypertension prevalence among the elderly population in Indonesia.

CONCLUSION

Based on the review of thirty research articles analyzed, it can be concluded that hypertension among the elderly is a multifactorial health problem. The main contributing factors to elevated blood pressure in older adults include genetic predisposition and family history, high sodium and fat intake, low levels of physical activity, smoking and alcohol consumption, psychological stress, and excessive nutritional status. Age also serves as an important determinant, as vascular elasticity and cardiac function naturally decline with aging. In addition to biological factors, behavioral and social aspects significantly influence the occurrence of hypertension. Social support, health knowledge, and active social engagement have been shown to help maintain stable blood pressure among the elderly. Conversely, low educational attainment and limited awareness of healthy lifestyles increase the risk of developing hypertension.

Preventive efforts for hypertension in older adults should focus on promotive and preventive strategies through health education, balanced dietary regulation, increased physical activity, stress management, and regular blood pressure monitoring at the primary healthcare level. Family- and community-based approaches are also essential to strengthen social support and improve adherence among elderly individuals in maintaining cardiovascular health.

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