The impact of social support as a moderating variable on the effectiveness of nursing inter-ventions in hypertension management

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Atallah Alenezi[1,2]*, Mohammed Hamdan Alshammari[3]

[1]Phd, Master of Nursing in Mental Health, BSN, College of Applied Medical Science, Shaqra university. Aldwadmi-Shaqra Road, Shaqra city, Riyadh Province, Saudi Arabia. https://orcid.org/0000-0002-6272-5379

[2]Associate Professor and Head of department of Nursing, College of Applied Medical Sciences, Shaqra University, Aldwadmi-Shaqra Road, Shaqra city, Riyadh Province, Saudi Arabia, 15572. Email: atta@su.edu.sa

[3]Mental Health Nursing Department, College of Nursing, University of Ha'il, Ha'il City, KSA, Saudi, Arabia. Email: mshammari@gmail.com. https://orcid.org/0000-0001-9661-192X

*corresponding author: Atallah Alenezi

Abstract

Hypertension management reduces cardiovascular disease, the world's leading cause of death and disability. Satisfied hypertension patients age better and take their medications better. This study will examine patient attitudes, medication adherence, and psychological health to determine how nursing interventions affect patient satisfaction. Social support moderates this relationship. A convenience sampling technique was used to gather our data from a sample of 470 hypertension patients receiving care at a tertiary hospital. The results of this study show that nursing interventions significantly and favorably affect patients' satisfaction with hypertension care. The study also shows that this link is strongly moderated by patient attitudes toward managing their hypertension, medication adherence, and psychological well-being. The moderating role of social support in the link between nursing interventions and patient satisfaction with hypertension care is also highlighted by our research. This study has important consequences for both policymakers and healthcare professionals.

Keywords: Nursing interventions, Patient satisfaction, Hypertension management, Patient attitude, Medication adherence.

Resumen

El control de la hipertensión reduce las enfermedades cardiovasculares, la principal causa de muerte y discapacidad en el mundo. Los pacientes hipertensos satisfechos envejecen mejor y toman mejor sus medicamentos. Este estudio examinará las actitudes de los pacientes, la adherencia a la medicación y la salud psicológica para determinar cómo las intervenciones de enfermería afectan la satisfacción del paciente. El apoyo social modera esta relación. Se utilizó una técnica de muestreo por conveniencia para recopilar datos de una muestra de 470 pacientes con hipertensión que recibían atención en un hospital terciario. Los resultados de este estudio muestran que las intervenciones de enfermería afectan significativa y favorablemente la satisfacción de los pacientes con el cuidado de la hipertensión. El estudio también muestra que este vínculo está fuertemente moderado por las actitudes de los pacientes hacia el manejo de su hipertensión, la adherencia a la medicación y el bienestar psicológico. Nuestra investigación también destaca el papel moderador del apoyo social en el vínculo entre las intervenciones de enfermería y la satisfacción del paciente con la atención de la hipertensión. Este estudio tiene importantes consecuencias tanto para los responsables políticos como para los profesionales de la salud.

Palabras clave: Intervenciones de enfermería, Satisfacción del paciente, Manejo de la hipertensión, Actitud del paciente, Adherencia a la medicación.

Both the patient and the healthcare professional must be satisfied with the patient's hypertension management. In order to effectively control hypertension, a multifaceted strategy that incorporates medication, lifestyle modifications, and routine monitoring is necessary[1-3]. The probability that patients adhere to their treatment plan rises when patients are satisfied with hypertension control. This entails adhering to prescription regimens, making lifestyle adjustments, and showing up on time for doctor's visits. To properly control hypertension and avoid major consequences like heart attack and stroke, compliance with therapy is crucial. A patient's quality of life is greatly impacted by hypertension. Headaches, tiredness, and vertigo are among the symptoms that patients with poorly controlled hypertension may encounter. Effective hypertension management can enhance a patient's quality of life by easing symptoms and avoiding problems[4].

Increased patient participation is also attributed to patient satisfaction with hypertension care. Patients are more likely to take an active role in controlling their conditions when they are happy with their care. This entails communicating with their healthcare practitioner and engaging in shared decision-making processes by way of inquiries and information requests[5,6]. Both patients and healthcare providers see cost savings as a result of effective hypertension management. Emergency department visits, hospital stays, and other expensive treatments can result from improperly controlled hypertension. Healthcare professionals can lower the total cost of treatment while improving patient outcomes by successfully controlling hypertension[7,8]. The implementation of nursing interventions is of paramount importance in the treatment of hypertension and has a noteworthy influence on patient contentment. Nurses possess the ability to impart knowledge to patients regarding the management of hypertension, which encompasses lifestyle modifications, medication administration, and blood pressure monitoring[2,9]. Patient empowerment and satisfaction with care is positively influenced by patient education and knowledge regarding their condition and effective management strategies[10].

Numerous investigations have been carried out on nursing interventions and patient satisfaction concerning hypertension management, focusing on particular patient cohorts, such as the elderly or those with concurrent medical conditions[11-14]. Few studies have identified mediating and moderating factors which affect the relationship between nursing interventions and patient satisfaction concerning hypertension management. Therefore, this study aims to examine how nursing interventions influence patient satisfaction with hypertension management. This study also investigates the mediating impact of patient attitude toward hypertension management, medication adherence and psychological well-being. Furthermore, the study also explored the moderating role of social support on the relationship between nursing interventions and patient satisfaction concerning hypertension management. The present research makes significant contributions for the healthcare sector. This study added in the body of literature by investigating the impact of nursing interventions on patient satisfaction and identifies four significant factors which are the patient's attitude towards hypertension management, their adherence to medication, and their psychological well-being that influence this relationship.

Research hypotheses
In this stuyd, these hopotheses are considered:

H1: Nursing interventions have a significant and positive impact on patient satisfaction with hypertension management

H2: Nursing interventions have a significant and positive impact on patient attitudes towards hypertension management

H3: Nursing interventions have a significant and positive impact on patient medication adherence.

H4: Nursing interventions have a significant and positive impact on patient psychological well-being.

H5: Patient attitudes towards hypertension management has a significant and positive impact on patient satisfaction with hypertension management

H6: Patient medication adherence has a significant and positive impact on patient satisfaction with hypertension management

H7: Patient psychology well-being has a significant and positive impact on patient satisfaction with hypertension management.

H8: Patient attitudes towards hypertension management significantly mediates the relationship between nursing intervention and patient satisfaction with hypertension management.

H9: Patient medication adherence significantly mediates the relationship between nursing intervention and patient satisfaction with hypertension management.

H10: Mediating role of patient psychological well-being significantly mediates the relationship between nursing intervention and patient satisfaction with hypertension management

H11: Social support significantly moderates the relationship between patient attitudes towards hypertension management and patient satisfaction with hypertension management

H12: Social support significantly moderates the relationship between patient medication adherence and patient satisfaction with hypertension management.

H13: Social support significantly moderates the relationship between patient psychological well-being and patient satisfaction with hypertension management.

Study Design
We used a cross-sectional survey approach in this study to assess the impact of nurse interventions on patient satisfaction with hypertension management. We were able to collect data at a particular moment in time and investigate the correlations between many variables thanks to this strategy.

Recruitment and sample
To guarantee a varied participant pool, we used a convenience sample strategy to recruit people from various healthcare settings, such as hospitals and community health centers. Given our study's restricted resources and time constraints, convenience sampling was chosen for its practicality and cost-effectiveness. G*Power software was used to calculate sample size, which took into account criteria such as independent and dependent variables, effect size, alpha level, and power. We intended for a minimum of 200 participation based on these concerns. We recruited 500 people to account for potential non-response and missing data. 470 of these surveys were considered eligible for further study.

Data collection
We used a self-administered questionnaire to collect data on numerous variables relevant to hypertension therapy. The questionnaire collected data on nursing interventions, patient satisfaction, patient attitudes, medication adherence, psychological well-being, and social support. The questionnaire included both

organized and unstructured questions to ensure a thorough insight. A Likert scale was used in closed-ended questions, allowing participants to indicate their level of agreement with assertions. Furthermore, open-ended questions encouraged participants to contribute more information and expound on their comments.

Statistical Analysis
We used Partial Least Squares Structural Equation Modeling (PLS SEM) to evaluate the gathered data. This statistical method was chosen because it is appropriate for assessing complex models with latent variables, which is typical in social science research. We were able to analyze the correlations between the research variables using PLS SEM and investigate potential mediating and moderating effects.

Results

Testing measurement model
Table 1 displays the outer loadings of a variable set in a research study pertaining to the management of hypertension. The term "outer loading" pertains to the degree of association between a given observed variable and its corresponding latent variable. The variables presented in the table have been categorized into five distinct constructs, namely nursing interventions, patient attitudes towards hypertension management, patient medication adherence, patient satisfaction with hypertension management, and patient psychological well-being. The identification of variables is accomplished through the use of codes such as NI, PA, PMA, PS, PSW, and SS which correspond to distinct items within each construct. The value of outer loading should be greater than 0.4[14,15].

Table 1. Outer Loading of Items

	Items	Outer Loading
Nursing Interventions	NI1	0.790
	NI2	0.757
	NI3	0.769
	NI4	0.786
	NI5	0.506
	NI6	0.751
Patient Attitudes Towards Hypertension Management	PA1	0.792
	PA2	0.899
	PA3	0.884
	PA4	0.883
Patient Medication Adherence	PMA1	0.847
	PMA2	0.676
	PMA3	0.879
	PMA4	0.495
Patient Satisfaction with Hypertension Management	PS1	0.808
	PS2	0.859
	PS3	0.722
	PS4	0.636
	PS5	0.642
	PS6	0.746
	PS7	0.656
Patient Psychological_ Well-being	PSW1	0.745
	PSW2	0.675
	PSW3	0.786
	PSW4	0.822
	PSW5	0.772
	PSW6	0.653
	PSW7	0.707
	PSW8	0.461
Social Support	SS1	0.593
	SS2	0.546
	SS3	0.780
	SS4	0.859
	SS5	0.835
	SS6	0.650

The measuring model's quality was evaluated by accessing individual items and the scale reliability of all components, followed by convergent and discriminant validity. Internal consistency of items can be used to assess reliability, whilst convergent and discriminant validity of constructs can be used to assess validity[16,17]. Cronbach's and CR confirmed the internal consistency of all questionnaire items[2]. Cronbach's of Nursing Interventions (α = 0.823) with 6 items, Patient Attitudes Towards Hypertension Management (α = 0.888) with 4 items, patient medication adherence (α = 0.713) with 4 items, patient psychological well-being (α = 0.856) with 8 items, patient satisfaction with hypertension management (α = 0.856) with 7 items and social support (α = 0.807) with 6 items are represented in Table 3. Table 3 also includes the CR results for all metrics, including the multi-dimensions of instructional methods. The CR is said to be a better tool for measuring accurate reliability findings[12]. The findings revealed that all construct attributes fulfilled a reasonable level of CR and Cronbach's alpha, with values greater than the threshold, i.e. 0.70[18]. The measurement of convergent validity gives correlational metrics that represent the extent of agreement among different indicators of the same construct. Convergent validity is established when the value of AVE reaches the threshold value, i.e. 0.5. Table 2 evaluates all constructs with AVEs greater than the threshold, i.e. 0.50. As a result, these values confirm the composites' one-dimensionality and the authenticity of convergent validity.

Table 2. Construct Reliability

Variables	Cronbach Alpha	CR	AVE
Nursing Interventions	0.823	0.873	0.538
Patient Attitudes Towards Hypertension Management	0.888	0.923	0.750
Patient Medication Adherence	0.713	0.823	0.548
Patient Psychological_ Well-being	0.856	0.889	0.505
Patient Satisfaction with Hypertension Management	0.856	0.887	0.531
Social Support	0.807	0.863	0.519

The Fornell-Larcker criterion of cross-loading indicators was used to evaluate the discriminant validity criterion of the measurement model[19]. The evaluation of discriminant validity ensures that reflective constructs and their indicators have substantial correlations in comparison to other constructs and their indicators. Hence, discriminant validity testing supports the empirical distinction between various ideas. The values of the correlations between the model constructs are shown in Table 4. The square root of AVE is used to compare these correlations between latent constructs according to the Fornell-Larcker cross-loading criteria. As a result, the discriminant validity increases with the square root of each latent construct's AVE in comparison to connection with other latent variables. The results confirm the discriminant validity value for nursing interventions (0.733), patient attitudes towards hypertension management (0.866), patient medication adherence (0.740), patient psychological well-being (0.710), patient satisfaction with hypertension management (0.729) and social support (α = 0.721) as shown in Table 3.

Table 3. Discriminant Validity (Fornell-Lacker)

	NI	PA	PMA	PSW	PS	SS
Nursing Interventions	0.733					
Patient Attitudes Toward Hypertension Management	0.583	0.866				
Patient Medication Adherence	0.629	0.535	0.740			
Patient Psychological Well-being	0.577	0.433	0.661	0.710		
Patient Satisfaction with Hypertension Management	0.297	0.216	0.458	0.550	0.729	
Social Support	0.482	0.321	0.611	0.702	0.483	0.721

This study examined the degree of model strength exhibited by patient attitudes towards hypertension management, patient medication adherence, patient psychological well-being, and patient satisfaction with hypertension management. The results indicated moderate levels of model strength. Each of the latent constructs in the models has a Q2 value greater than zero, which is a requirement for inclusion. The values of R2 and Q2 are presented in Table 4.

Table 4. R-Square values and Q-Square values for the variables		
	R2	Q2
Patient Attitudes Towards_ Hypertension Management	0.339	0.333
Patient Medication Adherence	0.395	0.387
Patient Psychological Well-being	0.333	0.325
Patient Satisfaction with Hypertension Management	0.364	0.148

Direct Path Analysis

Statistical validation of the model hypotheses was conducted using a bootstrapping method with 5,000 different samples[20,21]. This study used t and p values to determine whether the hypotheses should be accepted or rejected. A significant and positive impact of Nursing interventions on patient satisfaction with hypertension management was predicted by the H1 relationship. Having both a positive value of t and a positive value of p suggests that this hypothesis is correct (t = 1.765, P = 0.039). As a result, H1 is accepted. The second hypothesis stated that Nursing interventions have a significant and positive impact on patient attitudes towards hypertension management. Both the value of t and the value of p indicate that this hypothesis is in acceptable range (t = 18.510, P = 0.000). Therefore, H2 is accepted. The third hypothesis stated that Nursing interventions have a significant and positive impact on patient medication adherence. The value of t indicates that this hypothesis should be accepted (t = 22.264). As a result, H3 is accepted. The fourth hypothesis stated nursing interventions have a significant and positive impact on patient psychological well-being. The values of t and p point to the fact that this hypothesis will be accepted (t = 20.325, p = 0.000). As a result, H4 is accepted. The fifth hypothesis stated Patient attitudes towards hypertension management has a significant and positive impact on patient satisfaction with hypertension management. The values of t and p point to the fact that this hypothesis will be accepted (t equals 2.255, and P equals 0.012). As a result, H5 is accepted. The sixth hypothesis stated Patient medication adherence has a significant and positive impact on patient satisfaction with hypertension management. The values of t and p point to the fact that this hypothesis will be accepted (t equals 3.341, and P equals 0.000). As a result, H6 is accepted. The seventh hypothesis stated Patient psychology well-being has a significant and positive impact on patient satisfaction with hypertension management. The values of t and p point to the fact that this hypothesis will be accepted (t equals 5.874, and P equals 0.000). As a result, H7 is accepted. As shown in Table 5.

Table 5. Direct effects			
Constructs	Path coefficient	t-statistics	p-values
NI -> PS	0.096	1.765	0.039
NI -> PA	0.583	18.510	0.000
NI -> PMA	0.629	22.264	0.000
NI -> PSW	0.577	20.325	0.000
PA -> PS	0.126	2.255	0.012
PMA ->PS	0.257	3.341	0.000
PSW -> PS	0.396	5.874	0.000

Mediation Analysis

Patient attitude towards hypertension management mediates the relationship between nursing intervention and patient satisfaction with hypertension management as postulated in the hypothesis 8. The eighth hypothesis of this investigation is supported by the findings of the research. Patient medication adherence mediates the relationship between nursing intervention and patient satisfaction with hypertension management as postulated in hypothesis 9. The ninth hypothesis of this investigation is supported by the findings of the research. Patient psychological well-being mediates the relationship between nursing intervention and patient satisfaction with hypertension management as postulated in hypothesis 10. The tenth hypothesis of this investigation is supported by the findings of the research. Table 6 displays the findings of the mediation analysis that was performed.

Table 6. Meditation Effect			
	Original Sample	T Values	P Values
NI -> PA -> PS	0.073	2.189	0.014
N I-> PMA -> PS	0.161	3.320	0.000
NI -> PSW -> PS	0.229	5.700	0.000

Moderation Analysis

According to the eleventh hypothesis, social support acts as a significant moderating influence in the connection between patient attitude towards hypertension management and patient satisfaction with hypertension management. The findings of the research indicated t = 1.684, p = 0.046. As a result, solution H11 is approved. As the 12th hypothesis stated that social support acts as a significant moderating influence in the connection between patient medication adherence and patient satisfaction with hypertension management. The findings of the research indicated t = 4.264, p = 0.000. As a result, solution H12 is approved. According to the thirteenth hypothesis, social support acts as a significant moderating influence in the connection between patient psychological well-being and patient satisfaction with hypertension management. The findings of the research indicated t = 1.989, p = 0.023. As a result, solution H13 is approved. Table 7 illustrate the moderating effect that level of network centrality has on the relationship.

Table 7. Moderation Effect			
	Original Sample	T Values	P Values
SS x PA -> PS	0.084	1.684	0.046
SS x PMA -> PS	0.228	4.264	0.000
SS x PSW -> PS	0.093	1.989	0.023

Discussion

The first hypothesis investigates the impact of nursing interventions on patient satisfaction with hypertension management. Millions of individuals all around the world suffer from the widespread medical illness known as hypertension, sometimes known as high blood pressure. To avoid severe problems including heart disease, stroke, and renal damage, hypertension must be effectively managed[22,23]. Studies have demonstrated that nursing interventions are essential for managing hypertension and have a considerable, favorable effect on patient satisfaction. Patient education is one of the most important nursing interventions in the management of hypertension.

The second hypothesis investigates the nursing interventions on patient attitudes toward hypertension management. The therapy of hypertension relies heavily on nursing interventions, which have been proven in research to significantly and favorably affect patients' attitudes toward their disease[24]. Nursing interventions can take many different forms, including patient education, medication administration, suggestions for lifestyle changes, and continued observation and support.

The third hypothesis investigates the impact of nursing interventions on patient medication adherence. Patient medication adherence is greatly improved by nursing interventions. Ineffective medication adherence results in poor health, higher healthcare expenses, and a lower quality of life for the patient[25]. Through a variety of interventions, nurses have a unique opportunity to encourage drug adherence. They could inform patients on the value of taking their drugs as directed, possible adverse effects, and the effects of non-adherence, for example.

The fourth hypothesis investigates the impact of nursing interventions on patient psychological well-being. Addressing a patient's psychological needs is crucial since it can have a substantial impact on their physical health and recovery. The psychological health of the patient can benefit from nursing interventions, according to research. Patient education is one of the most successful nursing interventions. Moreover, nurses can encourage self-care and develop a sense of independence by teaching patients how to control their symptoms and avoid problems[26].

The fifth hypothesis investigates the impact of patient attitudes towards hypertension management on patient satisfaction with hypertension management. The overall level of patient satisfaction with hypertension care is greatly influenced by patient attitudes regarding hypertension management. Patients who are prepared to actively engage in their care and take charge of their health typically experience better outcomes and are more satisfied with their treatment[27]. This optimistic perspective on managing hypertension results in a more cooperative and fruitful interaction between patients and healthcare professionals.

The sixth hypothesis investigates the impact of patient medication adherence on patient satisfaction with hypertension management. Patient medication adherence significantly and favorably affects how happy they are with the way their hypertension is being managed. Patients are more likely to enjoy better blood pressure control and better health outcomes when they take their medications as directed[24]. This may result in better satisfaction with their entire experience receiving treatment and managing their hypertension. Medication adherence is a complicated issue that is affected by a number of variables, such as patient attitudes and views concerning medication, the complexity of the medication, and patient-healthcare provider communication[28].

The seventh hypothesis investigates the impact of patient psychological well-being on patient satisfaction with hypertension management. According to research, patient psychology and well-being are crucial factors in determining how satisfied patients are with their hypertension care. Patient satisfaction is crucial to ensuring medication adherence and lifestyle changes because hypertension is a chronic condition that necessitates ongoing care and therapy[29]. Lower satisfaction levels may result from patients' more negative perceptions of their hypertension management when they are stressed, anxious, or depressed[28,29].

The eighth hypothesis investigates the mediating effect of patient attitudes toward hypertension management between nursing intervention and patient satisfaction with hypertension management. Healthcare professionals and patients must work together to effectively manage hypertension, thus it's critical to recognize the variables that affect patient satisfaction with hypertension management[3]. Patient attitudes concerning their condition and the management techniques may have an impact on the effectiveness of these interventions[30]. Patients are more likely to respond favorably to nursing interventions and express better levels of satisfaction with their care when they are engaged and motivated to manage their hypertension.

The ninth hypothesis investigates the mediating effect of patient medication adherence between nursing intervention and patient satisfaction with hypertension management. To maintain optimal blood pressure control and lower the risk of problems related to hypertension, effective medication management is crucial. Understanding the variables that affect patient medication adherence and satisfaction with hypertension control is crucial[19]. The statement implies that patient medication adherence and satisfaction may have an impact on how well nursing interventions for the management of hypertension perform. This means that a patient's compliance with their medication regimen and level of satisfaction with their hypertension control may determine how beneficial nurse interventions are[20].

The tenth hypothesis investigates the mediating effect of patient psychological well-being between nursing intervention and patient satisfaction with hypertension management. A person's emotional, cognitive, and social well-being are all included under the umbrella term of psychological well-being. It includes elements like self-worth, optimism, resiliency, and social support aspects that have all been associated with better health outcomes[12]. The psychological health of a patient might affect how they react to nursing interventions and how satisfied they are with their treatment.

The eleventh hypothesis investigates the mediating effect of social support between patient attitudes toward hypertension management and patient satisfaction with hypertension management. An important element that is crucial to the overall management of hypertension is social support. A number of variables can have an impact on the complex link between patient attitudes about hypertension care and patient satisfaction with hypertension management. According to recent studies, social support may be able to moderate this link[15].

The twelfth hypothesis investigates the moderate effect of social support between patient medication adherence and patient satisfaction with hypertension management. It has been widely documented in the literature that medication compliance and patient satisfaction with hypertension therapy are correlated[20]. However, little research has been done on how social support functions in this connection. This study demonstrated a substantial association between patient medication adherence and patient satisfaction with hypertension therapy. Social support was found to significantly moderate this relationship.

The thirteenth hypothesis investigates the moderating effect of social support between patient psychological well-being and patient satisfaction with hypertension management. Recent studies have demonstrated that the link between patient psychological well-being and patient satisfaction with hypertension management is strongly moderated by social support[10]. This indicates that a patient's amount of social support may have an impact on how their psychological health influences how satisfied they are with their hypertension management. Greater psychological well-being in patients who receive more social support may translate into greater satisfaction with their hypertension care[19]. In order to strengthen their social support network, this may entail identifying patients who are at risk of having poor social support and offering suitable therapies[13,17].

The study's findings potentially contribute to the health behavior theory which indicated that an individual's perception towards a specific behavior can significantly impact their actions. This concept is also applicable to hypertension management, where patient attitude appears to mediate the relationship between nursing interventions and patient satisfaction, as indicated in the study's findings. This also means that nurses need to focus on changing patients' attitudes toward hypertension management to improve their satisfaction. Moreover, the study also contributes to the social support theory. According to the theory, social support buffers the negative effects of stress on health outcomes

This study also has some limitations. Sample size was too small to allow for much extrapolation beyond the current study. Results cannot be generalizable because this study was only limited to a particular healthcare facility. Another limitation of the study was

since patients were expected to report their own experiences and opinions, social desirability bias could have been introduced due to the reliance on self-reported data. Future research should address these limitations. Longitudinal designs that allow for the study of how nursing treatments affect patients over time and across a variety of outcomes are one possible strategy.

Conclusions

Managing hypertension in response to nursing interventions is a complex process that is affected by several variables. Higher levels of satisfaction are typically reported by patients who have an optimistic outlook on their treatment and show a significant commitment to following their pharmaceutical regimen. It has been shown that patients with greater psychological health and a more robust social network respond better to nursing interventions. Therefore, nurses must think about all of these factors while planning how to treat hypertension. Nursing treatments can be more effective and increase patient satisfaction if interventions are tailored to each individual's specific requirements and circumstances.

Conflict of interest: There is none.

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