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ORIGINAL RESEARCH

Prevalence and Associated Factors of Low Back Pain Among Healthcare Professionals at University of Gondar Comprehensive and Specialized Hospital, Northwest Ethiopia: Cross-Sectional Study

Nini Asfaw Negash[1], Azmeraw Tadele[2], Abebaw Jember Ferede[3]

[1]Department of Surgical Nursing, School of Nursing, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia; [2]Department of Nursing, University of Gondar Comprehensive Specialized Hospital, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia; [3]Department of Medical Nursing, School of Nursing, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia

Correspondence: Nini Asfaw Negash, Department of Nursing, College of Medicine and Health sciences, University of Gondar, Gondar, Ethiopia, Email niniasfaw27@gmail.com

Introduction: Low back pain is defined as mechanical pain of the lower part of the back. Globally large number of people suffer from low back pain and this number is increasing. This study aims to assess the prevalence and associated factors of low back pain among healthcare professionals at University of Gondar Compressive Specialized Hospital, northwest Ethiopia.

Methods: An institutional cross-sectional study was conducted among 423 healthcare professionals from March 20/2021-April 20/2021. A sample was selected from each profession through systematic random sampling technique after proportional allocation to each profession. Data were collected using a pre-tested structured self-administered English-version questionnaire, which was adapted from a standardized Nordic musculoskeletal questionnaire. The prevalence of low back pain was calculated and described by using frequency tables. Multivariate logistic regression model was fitted to identify factors associated with the prevalence of low back pain. Significance was considered at $p<0.05$ with 95% confidence interval.

Results: In this study, 423 healthcare professionals were included with the response rate of 95%. Among them 59.95% were males, 48.26% were less than 30 years old, 86% were degree holders and 57.21% were married. The prevalence of low back pain was 57.46% with 95% confidence interval (95%; CI = 52.6, 62.2). The median age of the respondents was 31± (28–32 IQR) years. Being female [AOR 1.81, 95% (CI = 1.079, 3.018)], frequent bending and twisting [AOR = 1.89, 95% CI (1.121, 3.200)], prolonged standing [AOR = 2.61, 95% (CI = 1.487, 4.597)], being a nurse [AOR = 5.80, 95% (CI = 2.070, 16.226)], and being a physician [AOR = 3.82, 95% (CI = 1.264, 11.531)] were predicted variables for low back pain.

Conclusion: More than 50 percent of the participants were suffering from low back pain. In this study being female, frequent bending, prolonged standing, and type of professionals were statistically significant factors of low back pain. It is better to equip the hospital with appropriate assistive devices to decrease frequent bending and twisting of healthcare workers.

Keywords: healthcare professional, low back pain

Introduction

Low back pain (LBP) is a dorsal pain which is below the costal margin and above the curvature of the gluteal.[1] Globally large number of people suffer from LBP and its burden is increasing over time. For instance, its prevalence hasincreased from 377.5 to 577 million from 1990–2017.[2] LBP occurs in all countries and affects all age groups.[3] A study conducted in 2015 revealed that the global point prevalence of activity-limiting low back pain was 7·3% and 540 million people were affected at some time in their life.[4]

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Low back pain is one of the work-related musculoskeletal disorders for healthcare professionals worldwide.[5] Work-related factors such as lifting, frequent bending and twisting, prolonged standing, being a nurse, and physical therapists were major factors with a complaint of LBP.[6–8]

Nurse and physical therapists are more vulnerable to low back pain than other professionals because work-related factors mostly included activities requiring back bending, lifting, pulling objects, and manual patient handling.[8] It is the major cause of job losses, changing a working setting, absenteeism, taking sick leave, disability, use of healthcare resources, severe financial losses, and limiting social and daily activities because of its severity.[1,8–11] Although LBP prevalence is high and leads to serious health consequence in developed countries, its prevalence and type of profession was not well studied as a factor in Ethiopia. This leads to a knowledge gap for policymakers and lack of a baseline for further studies. Therefore, this study aims to assess the prevalence and associated factors with low back pain among healthcare professionals working at University of Gondar Compressive Specialized Hospital. The findings of this study will be used as a baseline for future researchers, as an input for policymakers to decrease the problem by identifying the factors, efforts to decrease the problem of low back pain, and to seek preventive measures and treatments among healthcare professionals in the country. It is also essential for the clinicians to identify the factors that lead them to the development of low back pain and to take preventive measures early.

Methods and Materials

An institutional based cross-sectional study was conducted from March 20/2021 to April 20/2021 at University of Gondar Compressive Specialized Hospital. Gondar town is located in central Gondar zone Amhara National Regional state, northwest Ethiopia. It is 738 km from Addis Ababa, the capital of Ethiopia, and 180 km from Bihar Dar, regional state Amhara. This hospital serves more than 7 million people in its catchment area. The hospital has 1150 health care professionals, 580 beds in 5 different inpatient departments, 27 wards, and 14 different units giving outpatient services to customers. It provides a full range of health care services including outpatient, inpatient, and surgical services.

Population

All healthcare professionals working at University of Gondar Compressive Specialized Hospital (UOGCSH) were a source of the study population. Healthcare professionals who are working at University of Gondar Comprehensive Specialized Hospital for at least one year were included in the study. Participants who had a pregnancy, known LBP disease (such as a prolapsed disc, TB sodalities) and trauma were excluded from the study.

Eligibility Criteria

Inclusion Criteria

Selected health care professionals who are working at University of Gondar Comprehensive Specialized Hospital for at least one year were included in the study.

Exclusion Criteria

Participants who had pregnancy, known LBP disease (such as a prolapsed disc) and trauma were excluded from the study.

Operational Definition

Low back pain is defined as self-reported discomfort in the spinal area (pain between the lower costal margins and gluteal folds) with or without radiation into the leg to below the knee for at least 1 day during the past 12 months.[12]

Chronic low back pain: is persistent or fluctuating low back pain that lasts longer than three months.

Body mass index: is a person's weight in kilograms divided by height in meters square.

- <18.5 under weight
- 18.5–24.9 normal
- ≥25.0 overweight/obese.[13]

Static postures: Sitting or standing in a restricted space for two or more hours without changing positions.[14]

Frequent bending and twisting: working with the back bent without support, squatting, and kneeling for two or more hours.[14]

Lifting heavy objects: lifting anything that weighs more than 20 kg on a daily basis.[15]

Regular physical activity: regular physical activity was considered if a person exercised for at least 30 minutes or walked for 3 or more days per week.[16]

Current smoker: smoking in the past 30 days before the data collection was considered a current smoker.[16]

Healthcare profession: a term that represents a particular occupational group that includes a variety of professions, like nurses, doctors, and paramedics, involved in direct patient care and provision of healthcare services.[17]

Sample Size and Sampling Technique

The sample size was determined by using single population proportion formula considering 50% population proportion (p), 95% confidence level, 5% margin of error and 10% non response rate. The final calculated sample size was 423. The total number of healthcare professionals at University of Gondar Comprehensive Specialized Hospital were 1150. The lists of professionals and those who have annual leave or maternity leave were obtained from human resource administration and management office by professional identification number. There are 230 doctors, 495 nurses, 110 laboratory staff, 110 pharmacists, 12 physiotherapists, 124 midwives, 15 anesthetists, 9 optometrists, 20 radiographers, and 25 psychiatrists. The possible representative sample size for this study is 423. Samples were proportionally allocated with their profession and systematic random sampling technique was applied. A sample was obtained from each proportionally allocated profession through a systematic random sampling technique every interval of three, which was found to be the total number of healthcare professionals divided by the sample size.

Data Collection Tool and Procedure

Data were collected using a structured self-administered English version questionnaire which was adapted from a standardized Nordic musculoskeletal questionnaire.[18] The questionnaire is composed of socio-demographic factors incorporating age, sex, marital status, monthly income and educational status, which contained ten questions, individual factors that contained six questions, and their experience with LBP during the last 12 months, which contained nine questions. The questionnaire also included work-related factors like prolonged standing, lifting, transferring, or pulling patients or objects, type of profession, working hours, work shifting, and overexertion leading to back trauma.

Data Quality Control

One-day of training and orientation was given for supervisors and data collectors. Five nurses, having previous experience in data collection, and one BSc nurse supervisor were involved during data collection. To avoid recollection of data, a commonly agreed code by data collectors was given after reviewing and collecting data from each participant. Pretest was done on 5% of study subjects at Bihar Dar Comprehensive Specialized Referral Hospital and appropriate modifications on the questionnaire were done. The collected data were reviewed and checked for their completeness before their entry.

Data Processing and Analysis

After the data were checked for their consistency and completeness, data were coded and entered into Epi data version 4.6 and exported to Stata version 14.00 for analysis. The overall proportion with a 95% confidence interval (CI) was calculated to determine prevalence. The prevalence of low back pain was calculated and described by using a frequency table and bar chart. To determine factors associated with LBP among HCPs multivariable logistic regression was done. Variables having a p-value ≤ 0.05 in multivariable logistic regression are considered as statistically significantly associated factors. The odds ratio is also used to measure the strength of the association.

Result

Socio-Demographic Characteristics

In this study, 423 healthcare professionals were involved with a response rate of 95%. More than half of the participants, 241 (59.95%), were males. The median age of the respondents was 31± (28–35 IQR) years. Among the total respondents, 194 (48.26%) were less than 30 years and 366 (91.04%) were orthodox Christian followers. More than three fourths of the participants 317 (78.86%) were degree holders and 230 (57.21%) were married (Table 1).

Characteristics of Low Back Pain

From the total respondents, 231 (57.46%) had experienced low back pain in the past year. Out of 231 LBP sufferers about 16 (6.93%) were hospitalized and 83 (35.93%) changed their duty because of low back pain. One hundred sixteen (28.86%) participants experienced low back pain within the last seven days. The current point prevalence of LBP in this study was 23.38% and 59 (14.93%) of them had taken sick leave because of LBP (Table 2).

Most LBP sufferers were nurses 122 (52.81%) followed by physicians 44 (19.05%), laboratory professionals sufferered the least.

Work-Related Factors of LBP

Primary work-related factors for LBP were prolonged standing, frequent bending, and twisting. Two hundred forty-eight (61.69%) healthcare professionals had frequent bending, 299 (74.38%) had prolonged standing and 186 (46.27%)

Table 1 Socio-Demographic Characteristics of Healthcare Professionals at UOGCSH Northwest Ethiopia, 2021 (n = 423)

Variable	Categories	Frequency (n)	Percentage
Age group (years)	Less 30	194	48.26
	30–40	174	43.28
	Above 40	34	8.46
Sex	Male	241	59.95
	Female	161	40.05
Religion	Orthodox	366	91.04
	Protestant	16	3.98
	Muslim	20	4.98
Monthly income (birr)	Less than 5000	53	13.25
	5000–10,000	287	71.75
	Above 10,000	60	15.00
Education	Diploma	10	2.49
	Degree	317	78.86
	MSc and above	75	18.66
Work experience (year)	<5	201	50.00
	5–10	135	33.58
	11–15	43	10.70
	>15	18	5.72
Marital status	Married	230	57.21
	Single	172	42.79
BMI	<18.5	43	10.70
	18.5–24.99	325	80.85
	>25	34	8.4
Smoking	Yes	10	2.49
	No	392	97.51
Regular physical exercise	Yes	100	24.88
	No	302	75.22

Table 2 Characteristic of Low Back Pain Healthcare Professionals at UOGCSH, Northwest Ethiopia, 2021 (n = 231)

Finding of Low Back Pain	Categories	Frequency (n)	Percentage
LBP in the past 12 months	Yes	231	57.46
	No	171	42.54
Hospitalized due to low back pain	Yes	16	6.93
	No	215	93.07
Change job due to low back pain	Yes	148	64.07
	No	83	35.93
Duration of LBP in last 12 months	1 day	64	27.71
	1–7days	76	32.90
	Over a week	34	14.72
	Not recall	57	24.68
Reduce work due to LBP in the past 12 months	Yes	132	57.14
	No	99	42.86
Length of time LBP prevent from work	0 day	113	48.92
	1–7days	86	37.23
	8–30days	18	7.79
	More than 30 days	14	6.06
Seen by doctors	Yes	42	18.82
	No	189	81.82
LBP in the last 7 days	Yes	116	28.86
	No	286	71.14
LBP currently	Yes	94	23.38
	No	308	76.76
Take sick leave	Yes	60	14.93
	No	342	85.07

Table 3 Work-Related Factors of LBP Among Healthcare Professionals in UOGSCH in Northwest Ethiopia, 2021 (n = 423)

Variable	Categories	Frequency (n)	Percentage
Frequent bending or twisting	Yes	248	61.69
	No	154	38.31
Lifting heavy objects	Yes	182	45.27
	No	220	54.73
Sustained sitting	Yes	186	46.27
	No	216	53.73
Prolonged standing	Yes	299	74.38
	No	103	25.62
Transferring patients	Yes	228	56.72
	No	174	43.28
Positioning patient	Yes	262	65.17
	No	140	34.83
Working hour per day	4–6 hours	17	4.23
	6–8 hours	72	17.91
	More than 8 hours	313	78.84
Work shift	Day shift	73	18.16
	Night shift	6	1.96
	Both shifts (day and night)	323	80.35

sustained sitting. About 330 (80.35%), and 313 (78.64%) healthcare professionals worked both shifts and more than 8 hours, respectively (Table 3).

Prevalence of Low Back Pain

Annual prevalence of low back pain among healthcare professionals in this study was 57.46% with a CI of 95% (52.6−62.2%). The prevalence of LBP among nurse professions was higher 52.81%. Laboratory professionals suffered the least.

Factors Associated with Low Back Pain

In multivariable logistic regression analysis sex, frequent bending and twisting, sustained sitting, prolonged standing, and type of profession were statistically significant variables (Table 4). The odds of having LBP is 1.81 times [AOR = 1.805,

Table 4 Logistic Regression Analysis of Factors Associated with Low Back Pain Among Healthcare Professionals at UOGCSH, Northwest Ethiopia, 2021 (n = 423)

Variable		Low Back Pain		Crude Odds Ratio	Adjusted Odds Ratio
		Yes (n) (%)	No (n) (%)	COR (95%)	AOR (95%)
Gender	Male	127(52.7)	114(47.3)	1	1
	Female	104(64.6)	57(35.4)	1.64 (1.087, 2.468)	1.81(1.079, 3.019)*
Age group	<30 (young)	66(50.38)	65(49.62)	1	1
	30–40 (adult)	126(56.50)	97(43.5)	1.58(1.039, 2.391)	1.07(0.561, 2.042)
	≥40 (old)	34(73.50)	12(26.09)	1.72 (0.808, 3.676)	1.69(0.421, 6.779)
Marital status	Single	93(54.07) 138(60.00)	79(45.93)	1	1
	Married		92(40.00)	1.27(0.855,1.899)	1.16(0.685,1.956)
BMI	Less18.5	21(48.84)	22 (51.16)	1	1
	18.5–24.99	188(57.85) 22(64.71)	137(42.15)	1.44(0.760, 2.718)	1.40(0.683, 2.861)
	Above 25		12(35.29)	1.92 (0.763, 4.835)	1.86(0.631, 5.486)
Work experience	<5 years	104(51.74) 81(60)	97(48.26)	1	1
	5–10 years	30(69.77)	54(40)	1.40(0.899, 2.176)	1.24(0.622, 2.462)
	10–15 years	16(69.57)	13(30.23)	2.15(1.061, 4.365)	1.61(0.573, 4.523)
	>15 years		7(30.43)	2.13 (0.841, 5.405)	0.98(0.196, 4.940)
Professionals	Physician	44(54.32) 19(50.00)	37(45.68)	3.21(1.376, 7.490)	3.82(1.264, 11.531)**
	Pharmacy	122(70.11) 21(52.5)	19(50.00)	2.7 (1.029,7.085)	2.10(0.699, 6.266)
	Nurse	10(27.03)	52(29.89)	6.33(2.861, 14.025)	5.80(2.070, 16.226)**
	Midwife	15(46.88)	19(47.5)	2.98 (1.149, 7.753)	2.93(0.853, 10.052)
	Laboratory		27(72.97)	1	1
	Others		17(53.13)	2.38(0.872, 6.503)	3.19(1.010, 10.127)
Frequent bending and twisting	No	68(44.16) 163(65.73)	86(55.84)	1	1
	Yes		85(34.27)	2.43(1.606, 3.662)	1.89 (1.121,3.200)**
Lifting heavy object	No	109(49.55) 122(67.03)	111(50.45)	1	1
	Yes		60(32.97)	2.07(1.379, 3.120)	1.13(0.651,1.967)
Sustained sitting	No	141(65.28) 90(48.39)	75(34.72)	1	1
	Yes		96(51.61)	0.50(0.334, 0.745)	0.49(0.303, 0.781)**
Prolonged standing	No	37(35.92)	66(64.08)	1	1
	Yes	194(64.88)	105(35.12)	3.30 (2.065, 5.259)	2.61(1.487, 4.597)**
Transferring pts	No	83(47.7)	91(52.30)	1	1
	Yes	148(64.91)	80(35.09)	2.03 (1.355, 3.035)	0.87(0.462,1.639)
Position pts	No	62(44.29)	78(55.71,)	1	1
	Yes	169(64.50)	93(35.5)	2.29 (1.504, 3.474)	1.26(0.630, 2.530)
Income classification	Low	23(41.07)	33(58.93)	0.48(0.227,1.005)	0.49(0.174,1.392)
	Medium	173(60.28)	114(29.72)	1.04(0.588,1.841)	1.22(0.574,2.620)
	High	35(59.32)	24(40.68)	1	1

Notes: *P-value<0.05 shows significant, **P-value <0.01 shows highly significant.

95% (CI = 1.079, 3.019)] higher among female healthcare professionals as compared to males. The odds of developing LBP among healthcare professionals who had frequent bending and twisting were 1.89 times [AOR = 1.89, 95% (CI = 1.121, 3.200)] higher as compared to those who had not frequent and twisting. The odds of having LBP among healthcare professionals who had sustained sitting were 51% [AOR = 0.49, 95% (CI = 0.303, 0.781)] less likely as compared to those who had not sustained sitting. The odds of developing LBP among healthcare professionals who had prolonged standing were 2.6 times [AOR = 2.6, 95% (CI = 1.487, 4.597)] higher as compared to those who had not prolonged standing. The odds of developing LBP among physicians were 3.8 times [AOR = 3.8, 95% (CI = 1.264, 11.531)] higher as compared to being a laboratory professional; the odds of developing LBP among nursing professionals were 5.8 times [AOR = 5.8, 95% (CI = 2.070, 16.226)] higher as compared to being a laboratory professional. The odds of developing LBP among other professionals (radiographers, physiotherapists, anesthetists, psychiatrists, and optometrists) were 3.19 times [AOR = 3.19, 95% (CI = 1.010, 10.127)] higher as compared to being a laboratory professional.

Discussion

The prevalence of LBP reported in this study among healthcare professionals at the University of Gondar Comprehensive Specialized Hospital (UOGCSH) varies from studies conducted in other countries. The prevalence of low back pain among healthcare professionals in this study was 57.46% (a 95% (CI = 52.6%, 62.2%)) which is in line with the studies conducted in Malaysia, Pakistan, Tunisia, and South Africa 56.9%, 58%, 58.1%, and 59%, respectively.[19–22] This might be due to the similarity of work setting, socio-economic status, healthcare delivery system and socio-demographic distribution in these countries.[19,20]

The prevalence of low back pain in India among healthcare professionals was 45.7%,[23] in Bangladesh, Nigeria, and Ireland it was 11.9%, 39.1%, and 30%, respectively[24–26] which is lower than the result of this study. This difference could be due to methodological heterogeneity used; for instance, a study conducted in India used a non-probability convenient sampling technique whereas this study used a probability sampling technique.[23] Patients to healthcare professional's ratio was low in Ireland and back care dissimilarity might be the possible reason for this variation.[27,28]

The prevalence of low back pain among healthcare professionals in Saudi Arabia and China was 74.2% and 72.8%,[29,30] respectively. This is higher as compared to our study result. This might be due to the study conducted in Saudi Arabia was among OR staff where patients were mostly dependant on healthcare professionals.[30] While the study conducted in China addressed a national survey in eight tertiary hospitals which was more comprehensive than a study conducted in a single institution.[29]

In this study, being female had significant association with low back pain. The odds of being female are 1.81 times more likely to develop low back pain as compared to males. This result was supported by the studies conducted in Egypt, Saudi, Turkey, and Denzil.[8,12,31]

This variation could be related to the anatomical, physiological, and structural differences between women and men.[32] In addition to this, females tended to do extra professional activities in the household.[22] However, a cross-section study conducted in Kuwait and Uganda showed that being female was not significantly associated with low back pain.[12,19,33] Age, BMI, and work experience were not significantly associated factors for LBP in the present study ($p>0.05$), but were reported as significant in other studies.[19,33] This is probably due to the younger age distribution for respondents in the present study.

The odds of developing LBP among nurse professionals were 5.8 times higher as compared to laboratory professionals. This might be because nurses had direct patient contact with manual handling, transferring, prolonged standing, frequent bending and twisting.[20] The odds of developing LBP among physicians were 3.8 times higher as compared laboratory professionals. The odds of developing LBP among other professionals were 3.19 times higher as compared to laboratory professionals. This could be due to physicians and other professionals having more manual patient handling, lifting patients, and prolonged standing than laboratory professionals.

In this study, frequent bending and prolonged standing positions were work-related factors with LBP. Sustained sitting was a protective factor in the present study but a risk factor for LBP in other studies.[31,34] The odds of developing LBP among healthcare professionals who had frequent bending and twisting were 1.89 times higher as compared to those who had not frequent bending and twisting. This might be due to frequent bending combined with lifting heavy objects having serious

consequences on the lower back. It greatly increases the intra disc pressure and may damage the discs. Repetitive bending forward (flexion) and twisting (rotation) are shear and compressive forces on the disc that leads to torn, herniated discs and tears.[35]

In addition, the odds of developing LBP among healthcare professionals who had prolonged standing were 2.6 times higher as compared to those who had not undergone prolonged standing. This might be due to prolonged standing for the length of time being the main cause for spinal hypo-mobility that may directly lead to degenerative changes within the lumbar spine, pushing the pelvis backwards, and increasing the curve of low back pain (lumbar region) that can make low back muscles tighten and spasm; resulting in pain on the spinal nerve.[36–38] Prolonged standing effectively reduces the blood supply to the muscle resulting in the acceleration of the onset of fatigue and causes pain in the muscles of the back.[39] However, the odds of developing LBP among healthcare professionals who had sustained sitting were 51% less likely as compared to those who had not sustained sitting (sitting more than two hours).

Conclusions and Recommendations

The estimated prevalence of low back pain was more than fifty percent of the participants. In this study being female, nurse, physician, and other professional types, frequent bending and twisting, and prolonged standing were important significant associated factors with LBP among healthcare professionals. However, sustained sitting was a protective factor for low back pain. This problem may negatively affect health and economical status through reduction of activity performance and decreased work hours. Therefore, it is better to equip the hospital with appropriate assistive devices to decrease the frequent bending and twisting of healthcare workers.

Limitation of the Study

Due to recall bias, the annual prevalence may be underestimated or overestimated. The study was conducted only in one hospital; including additional hospitals would give more comprehensive results.

Abbreviations

BMI, body mass index; CI, confidence interval; HCP, healthcare professionals; LBP, low back pain; OR, odds ratio; OR, operation room; UOGCSH, University of Gondar Compressive Specialized Hospital.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from the Ethical Review Committee on behalf of the School of Nursing, College of Medicine and Health Sciences, University of Gondar and permission was obtained from the Chief Executive Officer and Nursing Director of University of Gondar College of medicine and health sciences. Written informed consent was obtained from each study participant. Confidentiality and privacy were maintained during the data collection, analysis and reporting. The anonymity of respondents kept confidential since no name was written; only coded numbers were used.

Data Sharing Statement

Data will be available upon reasonable request from the corresponding author.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

All authors declared that they have no competing interests.

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