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Original Article

A comprehensive evaluation of risk factors underlying the etiology and progression of spinal discopathy across diverse population

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ABSTRACT

Discopathy, a disorder affecting the structure and function of vertebral discs, is a common cause of spinal pain, presenting with varying intensities. Its occurrence is influenced by factors such as age, height, weight, sex, family history, daily activities, and behavioral habits. As an epidemic in many individualized nations, back pain, now considered an epidemic in many industrialized nations, is the second leading cause of medical consultations and causes long-term disability in approximately 1% of the population. This study investigates the key risk factors associated with spinal discopathy. A case-control epidemiological study was conducted with a sample of 300 participants: 100 in the case group (patients with discopathy) and 200 in the control group (individuals without discopathy). Data were collected through questionnaires covering demographic information and risk factors. Statistical analyses included correlation factors, independent t-tests, chi-squared tests, logistic regression, and adjusted regression to evaluate the relationships between variables and discopathy risk. No significant differences were found between the case and control groups in terms of age (p=0.88), sex (p=0.086), marital status (p=0.392), residence status (p=0.453), or body mass index (BMI) (p=0.134). However, significant differences were observed in the prevalence of musculoskeletal disorders (p=0.045), harmful occupations (p=0.003), smoking (p=0.037), regular walking (p=0.003), and family history of discopathy (p=0.001). This study highlights the importance of targeted screening for individuals with a family history of discopathy and those with musculoskeletal disorders. Preventive measures, including promoting regular walking and addressing harmful occupational and lifestyle factors, could reduce the incidence and progression of discopathy.

Keywords: Discopathy, Risk factors, Musculoskeletal disorders, Spine, Fmily history, Regular walking

Introduction

Musculoskeletal diseases, among the most prevalent and costly health issues across all age groups, lead to disability, early retirement, and economic losses[1]. Spinal discopathy, a condition affecting the vertebral discs, is a significant contributor to spinal pain and falls within this category of disorders[2]. It is the effect of various causes including age, weight, sex, family history, daily activities, and poor behavioral habits[3]. In Iran, back pain affects diverse demographics, leading to reduced productivity, increased healthcare expenses, and socioeconomic damages[4,5].

Discopathy is a multifactorial disease associated with degenerative and mechanical processes. Early studies emphasized age, sex, occupation, smoking, and heavy lifting as primary risk factors. Recent advancements, however, have highlighted the significant role of genetic predisposition[6]. Research suggests that discopathy, like many other conditions, results from a combination of genetic and environmental factors[7].

Numerous studies have examined various aspects of discopathy[8-10]. For example, Mashhadinezhad Ganjeifar (2015) demonstrated the impact of timely surgery on patient satisfaction for disc herniation-induced sciatica[11]. Najafabadi (2019) emphasized the prevalence of back pain in white-collar employees in developing countries[12]. Other studies have explored alternative therapies such as reflexology and aquatic exercises, finding them beneficial for managing discopathy-

induced pain[13-15]. Genetic predisposition, particularly family history, has also been strongly linked to increased susceptibility to discopathy[16-23].

Despite extensive research, no comprehensive study in Iran has evaluated the risk factors for spinal discopathy. Given the cultural, occupational, and lifestyle factors unique to different societies, this study aims to identify the key risk factors and general health characteristics of individuals with spinal discopathy[24-26].

Materials and Methods

This case-control epidemiological study included 300 participants from the neurosurgery and orthopedic wards of Dezful University of Medical Sciences. Patients diagnosed with spinal discopathy formed the case group (n=100), while the control group (n=200) comprised healthy individuals matched demographically. Data collection was conducted using validated questionnaires addressing demographic, socioeconomic, and lifestyle factors.

Participants aged over 18 years with no history of high-risk chronic illnesses or trauma-induced discopathy were included. Exclusion criteria included incomplete questionnaire responses or withdrawal of consent. Statistical analyses were performed using SPSS 22, employing independent t-tests, chi-squared tests, and logistic regression.

Results and Discussion

The case and control groups had mean ages of 48.5 and 47.8 years, respectively, with no significant difference (p=0.88). Sex, marital status, and residence status also showed no significant relationships[27]. BMI was slightly higher in the case group but did not significantly affect discopathy risk (p=0.134)[28,29].

Table 1-A. frequency distribution and comparison of musculoskeletal disorders history in case and control groups

		Yes	No	Sum	p-value
		Count	Count	Count	0.045
musculoskeletal disorders history	**Patients with discopathy (case)**	71	29	100	
	No discopathy (control)	120	79	199	
	Sum	191	108	299	
Harmful occupation	**Patients with discopathy (case)**	98	2	100	0.003
	No discopathy (control)	3	196	199	
	Sum	101	198	299	
Smoking	**Patients with discopathy (case)**	30	70	100	0.037
	No discopathy (control)	29	170	199	
	Sum	59	240	299	

Table 1-B. frequency distribution and comparison of Regular Walking history in case and control groups

Regular walking	Patients with discopathy (case)	35	65	100	0.003
	No discopathy (control)	120	79	199	
	Sum	155	144	299	

According to **Table 1-A**, the percentage of a family history of musculoskeletal disorders is 71% and 60.3% in the case and control groups, respectively, so the difference is significant (p=0.045). In addition, harmful occupation in the case group is significantly higher than the control group (p=0.003). **Table 1-A** shows that the smoking rate in the case group is higher than the control group and the difference is reported to be significant (p=0.037). **Table 1-B** illustrates that Regular walking is higher in the control group compared to the case group and the difference is significant (p=0.003).

Significant associations were observed for musculoskeletal disorders (p=0.045), harmful occupations (p=0.003), smoking (p=0.037), regular walking (p=0.003), and family history of discopathy (p=0.001). Among the case group, 58% had immediate relatives with discopathy, and 44% experienced lumbar discopathy, 35% cervical discopathy, and 21% both[30-36].

Table 2. comparison of mean BMI in the case and control groups

	Count	Mean	STD	Minimum	Maximum	p-value
Discopathy	100	26.29	4.94	16.33	37.11	0.134
No discopathy	199	25.43	4.12	15.42	42.97	

According to **Table 2**, the mean BMI in the case and control groups was obtained to be 26.29 (STD=4.94) and 25.43 (STD=4.12), respectively with a p-value of 0.134, indicating that the difference is not significant[37,38].

Table 3. comparison of frequency distribution and family history of discopathy in the case and control groups

		Yes	No	Sum	p-value
		count	count	count	0.003
Family history of discopathy	Discopathy (case)	65	35	100	
	No discopathy (control)	75	142	199	
	Sum	122	177	299	

Table 3 shows that the family history of discopathy is higher in the case group compared to the control group, and the difference is significant (p=0.001)[39].

Table 4. frequency distribution of family relative in the case group

	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)
Family relative	Siblings	Parents	Second-degree relatives	No history of discopathy	Sum
Case group	32	26	7	35	100

According to **Table 4**, of 65 subjects of the case group with a family history of discopathy, 58% have immediate relatives (siblings or parents) and 7% have second-degree relatives (aunts and uncles and their children, grandfathers and grandmothers) with discopathy disorders.

Count (%) Count (%) Count (%) Count (%)

Table 5. frequency distribution of the type discopathy in the case group

Type of discopathy	Lumbar vertebrae	Neck vertebrae	Both	Sum
Case group	44	35	21	100

According to **Table 5**, 44%, 35% and 21% of the subjects of the case group suffer lumbar discopathy, neck discopathy and both, respectively.

This study confirms that environmental, genetic, and lifestyle factors collectively influence discopathy risk. Family history emerged as a strong predictor, consistent with prior research reporting familial predisposition as a key risk factor. Occupations involving heavy lifting and repetitive physical strain were significantly associated with discopathy, aligning with previous findings.

Smoking was another significant risk factor, corroborating studies link it to vertebral disc degeneration. Conversely, regular walking was identified as a protective factor, reducing the risk of discopathy even in individuals with hereditary predisposition[40].

Although BMI was not significant in this study, other research has linked obesity to increased discopathy risk, emphasizing the need for further investigation. Additionally, patients with discopathy reported poorer physical health, increased anxiety, sleep disturbances, and higher rates of depression, underscoring the broad impact of this condition on quality of life[41,42].

Conclusion

Discopathy arises from the interplay of genetic, environmental, and lifestyle factors. While family history and occupational risks are significant contributors, regular walking can mitigate its onset and progression. Public health initiatives should focus on education, promoting active lifestyles, and reducing workplace risks to prevent discopathy. Furthermore, medical curricula should emphasize the importance of identifying and addressing these risk factors to improve patient outcomes.

Hospitals and clinics should implement multidisciplinary strategies, combining medical treatments with preventive interventions, to address the growing burden of discopathy.

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