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Preoperative Risk Factors for Abdominal Wound Dehiscence: A Study of 200 Cases

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Abstract:

Background: *Abdominal wound dehiscence (AWD) is a serious postoperative complication influenced by multiple preoperative, intraoperative, and postoperative factors. Preoperative risk factors such as anemia, malnutrition, diabetes, chronic obstructive pulmonary disease (COPD), hypoalbuminemia, steroid use, and emergency surgery have been implicated.*

Objective: *To identify the preoperative risk factors contributing to AWD in patients undergoing abdominal surgeries in tertiary hospitals.*

Methods: *This prospective observational study was conducted from September 2012 to February 2013 across the Departments of Surgery and Obstetrics & Gynaecology at three tertiary hospitals: Kumudini Women's Medical College Hospital, Dhaka National Medical College Hospital, and Shaheed Monsur Ali Medical College Hospital. A total of 200 cases were included, with detailed patient histories (obtained from patients or attendants), comprehensive clinical examinations, and relevant preoperative investigations recorded systematically. Data were compiled, coded, and analyzed using SPSS, with emphasis on identifying preoperative risk factors and their association with abdominal wound dehiscence (AWD)*

Results: *The mean age of patients was 32.45 (±13.96) years, with a male-to-female ratio of 4.27:1 in the surgery unit. The peak incidence of AWD occurred in patients >50 years (surgery) and 21–30 years (Obstetrics & Gynaecology). Most dehiscences (70.7% in surgery, 76.2% in OBGYN) occurred in patients with ≥3 risk factors. The highest incidence was observed on the 6th postoperative day, with 83% partial and 17% complete dehiscences. Significant preoperative risk factors included peritonitis ($p<0.05$), emergency surgery, anemia, and malnutrition. The overall AWD rate was high (100 out of 1358 surgeries).*

Conclusion: *Multiple preoperative risk factors, particularly peritonitis, anemia, and malnutrition, significantly increase the likelihood of AWD. Early identification and mitigation of these factors may reduce the incidence of wound dehiscence in high-risk surgical patients.*

Keywords: *Abdominal wound dehiscence, Anemia, Malnutrition, Preoperative risk factors, Peritonitis, Postoperative complications*

1. Introduction

Abdominal wound dehiscence (AWD) continues to be a major postoperative complication in contemporary surgical practice, with recent studies reporting incidence rates between 1-5% [1,2]. This condition, characterized by partial or complete separation of surgical wound layers, can progress to evisceration - a surgical emergency requiring immediate intervention [3].

Despite improvements in surgical techniques and perioperative management, AWD still poses significant clinical and economic challenges,

including extended hospital stays, increased healthcare expenditures, and mortality rates of 8-15% [4,5]. The development of AWD involves multiple contributing factors that can be categorized as patient-related, surgical, and postoperative elements [6]. Key preoperative risk factors include malnutrition (particularly hypoalbuminemia below 3.0 g/dL), poorly controlled diabetes (HbA1c exceeding 7%), chronic kidney disease, anemia (hemoglobin less than 10 g/dL), and chronic obstructive pulmonary disease [7,8]. Emergency surgical procedures carry a two to three times greater risk of AWD compared to elective operations due to less optimal patient conditions [9]. Additional risk factors such as obesity (BMI of 30 or higher) and immunosuppressive conditions (including corticosteroid use and chemotherapy) further compromise tissue repair processes [10,11]. Surgical technique factors play a pivotal role in AWD development. Current evidence supports mass closure techniques using slowly absorbable sutures (such as polydioxanone) as the preferred method for midline laparotomies, demonstrating lower dehiscence rates compared to traditional layered closure methods [12,13]. However, the surgeon's skill level and ability to achieve tension-free wound closure remain critical factors for successful outcomes [14]. Postoperative complications, particularly surgical site infections, show a strong association with AWD, with infected wounds exhibiting a fivefold increase in risk [15]. Other significant postoperative factors include ileus, vomiting, and excessive coughing, all of which increase intra-abdominal pressure and mechanical stress on the healing wound [16]. Recent studies indicate that enhanced recovery after surgery protocols, incorporating early mobilization and optimized pain management, may help reduce these risks [17]. Despite these advances, AWD remains insufficiently studied in resource-limited settings where challenges such as prevalent malnutrition, limited access to preoperative optimization, and high rates of emergency surgeries may contribute to higher incidence rates [18]. This study aims to identify the most significant preoperative risk factors for AWD in a tertiary hospital environment, with the ultimate goal of improving risk assessment and prevention strategies.

2. Materials And Methods

This prospective study was conducted from September 2012 to February 2013 across the Departments of Surgery and Obstetrics & Gynaecology at three tertiary care hospitals: Kumudini Women's Medical College Hospital (Mirzapur, Tangail), Dhaka National Medical College Hospital, and Shaheed Monsur Ali Medical College Hospital. The study population comprised 200 patients of varying age groups and both genders who underwent laparotomy (either emergency or elective) during the study period. Participants were selected through purposive sampling, with inclusion criteria encompassing all laparotomy cases performed within the study hospitals. Patients who underwent operations at other facilities or were admitted solely for postoperative complications, including wound dehiscence, were excluded. Data collection involved a comprehensive review of patient records, including demographic information, preoperative risk factors, surgical details, and postoperative outcomes. Standardized protocols were employed to document cases of abdominal wound dehiscence, with particular attention to timing, severity (partial or complete), and associated risk factors. All data were systematically recorded, verified, and analyzed to identify significant associations between preoperative variables and wound dehiscence outcomes. The study adhered to ethical guidelines and received necessary institutional approvals before commencement.

3. Results

The study revealed significant findings regarding abdominal wound dehiscence (AWD) patterns and associated risk factors. The mean age of participants was 32.45±13.96 years, with distinct age-related patterns observed between surgical specialties. In general surgery patients, the highest AWD incidence (31%) occurred in those aged >50 years, showing statistical significance. Conversely, obstetrics and gynecology patients demonstrated peak AWD rates (38.1%) in the 21–30-year age group, though this finding lacked statistical significance. Gender distribution showed notable disparities, with male patients constituting 81% of AWD cases in general surgery, compared to 19% female cases. The male-to-female ratio was 4.27:1 in the AWD group versus 2.84:1 in controls. Occupational analysis revealed housewives represented the largest proportion (57.1%) of AWD cases in obstetrics/gynecology, while day laborers (22.4%) and service holders (20.7%) predominated in general surgery AWD cases. Critical preoperative risk factors significantly associated with AWD included peritonitis (58.6% in surgery), anemia (36.2% surgery, 69% OBGYN), and malnutrition (25.9% surgery, 26.2% OBGYN). Emergency operations substantially increased AWD risk (79.3%

surgery, 78.6% OBGYN) compared to elective procedures. The 6th postoperative day marked the peak incidence of AWD, with most cases occurring between postoperative days 5-8. Incision type analysis showed midline vertical incisions accounted for 67.2% of surgical AWD cases, while Pfannenstiel incisions represented 83.3% of OBGYN AWD cases. A strong dose-response relationship emerged between risk factor quantity and AWD likelihood, with 37.9% of surgical and 40.5% of OBGYN AWD cases having ≥4 risk factors. The study found 83% of AWD cases were partial dehiscences, while 17% were complete.

Table 1. *Age group distribution of the study population (N=200)*

Age group	Dehiscence			Non-Dehiscence		
	Surgery n=58	**Obs & Gynae n=42**	**Total n=100**	**Surgery n=50**	**Obs & Gynaen=50**	**Total n=100**
	n(%)	n(%)	n(%)	n (%)	n(%)	n(%)
<20 yrs.	8 (13.8)	2 (4.8)	10	11 (22)	10 (20)	21
21-30 yrs.	07 (12.1)	16 (38.1)	23	15 (30)	18 (36)	33
31-40 yrs.	12 (20.7)	9 (21.4)	21	8 (16)	9 (18)	17
41-50 yrs.	13 (22.4)	6 (14.3)	19	9 (18)	5 (10)	14
>50 yrs.	18 (31.0)	9 (21.4)	27	7 (14)	8 (16)	15

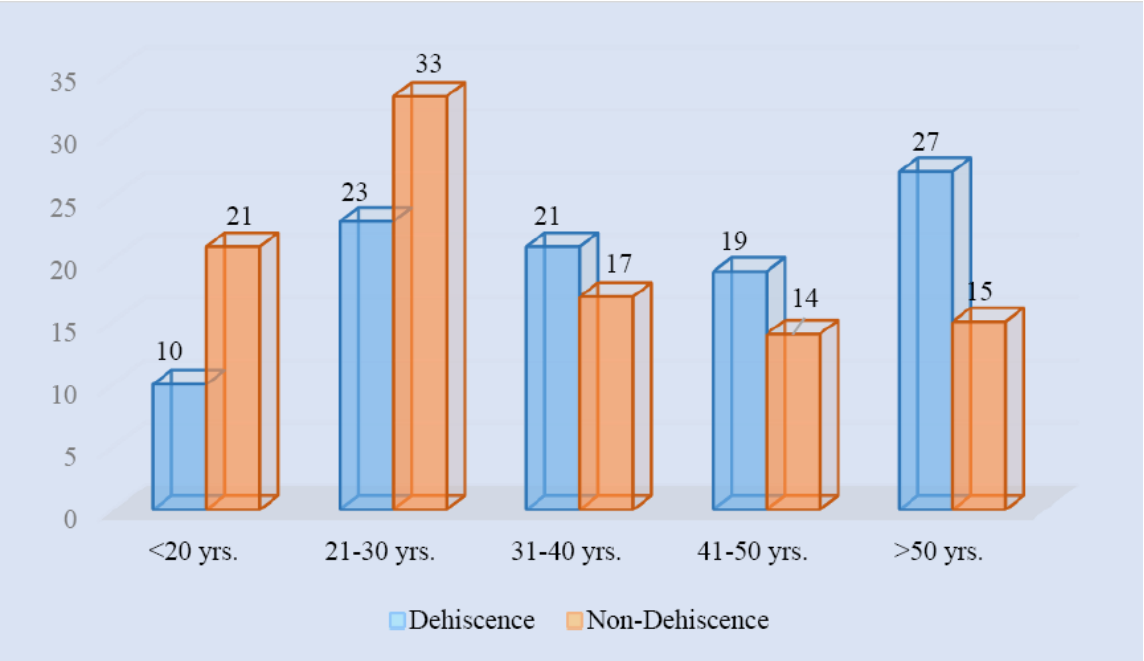

Figure I. *Column chart showed age group distribution of the study population (N=200)*

Table 2. *Sex distribution of the study population (N=200)*

sex	Dehiscence			Non-Dehiscence		
	Surgery n=58	**Obs & Gynae n=42**	**Total n=100**	**Surgery n=50**	**Obs & Gynae n=50**	**Total n=100**
	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Male	47 (81)	00	47	37 (74)	00	37
Female	11 (19)	42 (100)	53	13 (26)	50 (100)	63

Table 3. *Occupational status of the study population (N=200)*

Occupation	Dehiscence N=100			Non-Dehiscence N=100		
	Surgery n=58	**Obs & Gynae n=42**	**Total n=100**	**Surgery n=50**	**Obs & Gynae n=50**	**Total n=100**
	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Farmer	7 (12.1)	1 (2.4)	8	4 (8)	0	4
Businessman	11 (19.0)	0	11	8 (16)	1 (2)	9
Service Holder	12 (20.7)	11 (26.2)	23	15 (30)	14 (28)	29
Housewife	8 (13.8)	24 (57.1)	32	9 (18)	28 (56)	37
Student	5 (8.6)	2 (4.8)	7	6 (12)	4 (8)	10
Day Laborer	13 (22.4)	4 (9.5)	17	7 (14)	3 (6)	10
Driver	2 (3.4)	0	2	1 (2)	0	1

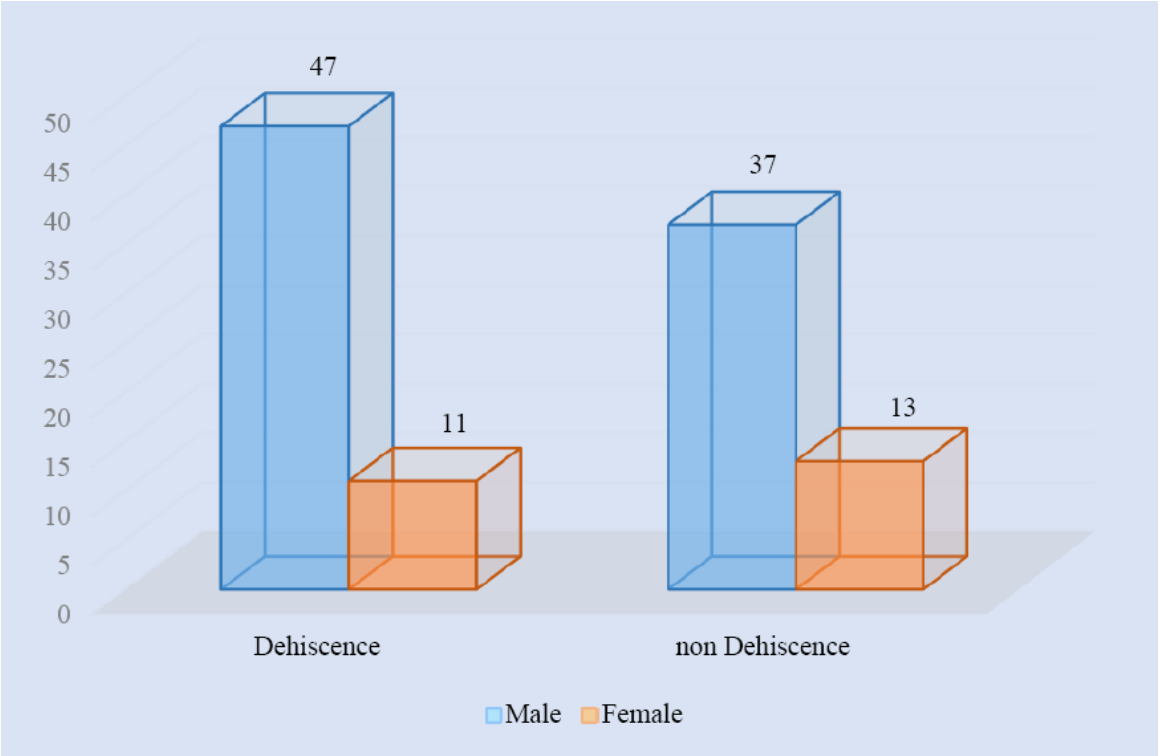

Figure II. *Column chart showed sex distribution of the study population in the surgery unit (N=200)*

Table 4. *Pre-operative risk factors of the study population (N=200)*

Risk Factors	Surgery			Obs & Gyne		
	Dehiscence n=58	Non-Dehiscence n=50	P value	Dehiscence n=42	Non- Dehiscence n=50	P value
	n (%)	n (%)		n (%)	n (%)	
Peritonitis	34 (58.6)	13 (26	0.001	1 (2.4)	00	0.45
Anaemia	21 (36.2)	04 (08)	0.001	29 (69)	11 (22	<0.001
Malnutrition	15 (25.9)	03 (06)	0.01	11 (26.2	04 (08)	0.03
COPD/Asthma	08 (13.8)	02 (04)	0.10	02 (4.8)	01 (02)	0.59
Diabetes Mellitus	11 (19)	03 (06)	0.04	07 (16.7)	02 (04)	02 (04)
Steroid Therapy	05 (8.6)	01 (02)	0.21	00	00	--
Jaundice	04 (6.9)	01 (02)	0.62	00	00	--
Uraemia	02 (3.5)	00	0.49	01 (24)	00	--
Obesity	06 (10.3)	01 (02)	0.12	08 (19)	02 (04)	0.03
Malignancy	03 (5.2)	02 (04)	1.0	03 (7.1)	01 (02)	0.32

Table 5. *Nature of operation (N=200)*

Nature of operation	Surgery			Obs & Gynae		P value
	Dehiscence n=58	Non- Dehiscence n=50	P value	Dehiscence n=42	Non-Dehiscence n=50	
	n(%)	n(%)		n(%)	n(%)	
Emergency operation	46 (79.3)	18 (36)		33 (78.6)	29 (58)	
Elective operation	12 (20.7)	32 (64)	<0.001	09 (21.4)	21 (42)	0.03

Table 6. *Type of incision made (N=200)*

Type of incision	Surgery		Obs & Gynae	
	Dehiscence n(%)	Non- dehiscence n(%)	Dehiscence n(%)	Non-dehiscence n(%)
Vertical				
Midline	39 (67.2)	29 (58)	07 (16.7)	02 (04)
Paramedian	04 (6.9)	7 (14)	00	00
Total	43 (74.1)	36 (72)	07 (16.7)	02 (04)
Transverse				
Grid-iron	14 (24.1)	14 (28)	00	00
Rutherford Morison	01 (1.7)	00	00	00
Pfannenstiel	00	00	35 (83.3)	48 (96)
Total	15 (25.9)	14 (28)	35 (83.3)	48 (96)

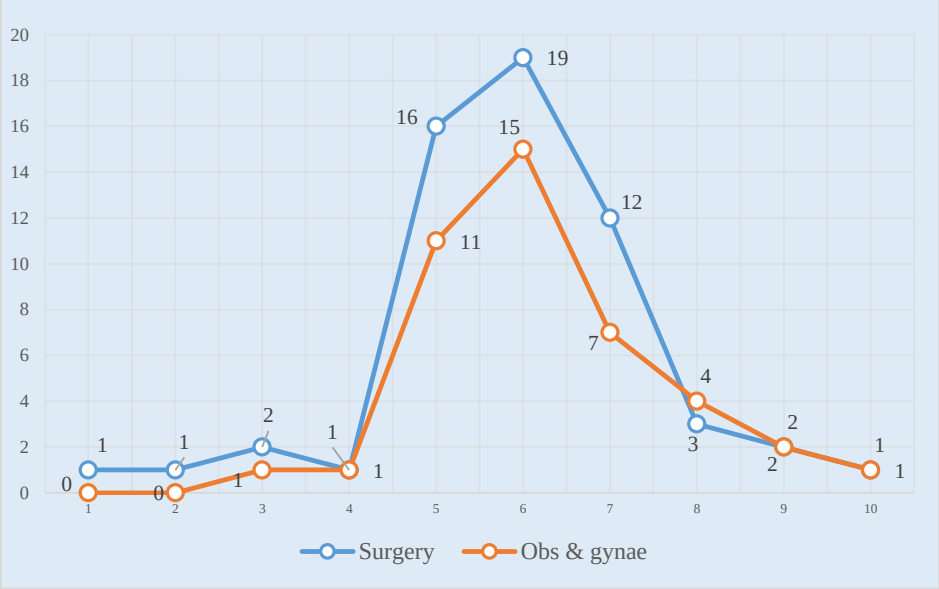

Figure III. *Line chart showed postoperative day of wound dehiscence scale (N=200)*

Table 7. *Number of risk factors in cases of wound dehiscence (N=200)*

Number of risk factors	Surgery			Obs & Gynae		
	Dehiscence n=58	Non-Dehiscence n=50	P value	Dehiscence n=42	Non- Dehiscence n=50	P value
	n(%)	n(%)	<0.001	n(%)	n(%)	<0.001
≤2	17 (29.3)	36 (72)		10 (23.8)	42 (84)	
3	19 (32.8)	10 (20)		15 (35.7)	05 (10)	
≥4	22 (37.9)	04 (08)		17 (40.5)	03 (06)	

4. DISCUSSION

The findings of this study provide valuable insights into the multifactorial nature of abdominal wound dehiscence (AWD) in a tertiary care setting. Our results demonstrate several key patterns that align with and expand upon existing literature while highlighting important regional considerations. The observed mean age of 32.45±13.96 years reflects a relatively younger patient population compared to Western studies, where AWD typically affects older individuals [19].

However, our finding that patients >50 years had the highest AWD rates in general surgery (31%) corresponds with established evidence that aging impairs wound healing through reduced collagen synthesis and slower epithelialization [20]. The predominance of AWD among 21–30-year-olds in obstetrics/gynecology may reflect local demographic patterns of childbirth and gynecological surgeries, suggesting the need for specialty-specific prevention strategies [21]. The striking gender disparity in general surgery AWD cases (81% male) likely relates to occupational exposures and higher rates of emergency abdominal surgeries among males in our population [22]. This contrasts with Western data showing more equitable gender distribution, underscoring how regional epidemiological patterns influence surgical outcomes [23]. The occupational profile of AWD cases, particularly the high proportion of day laborers (22.4%), suggests physical strain and delayed healthcare access may contribute to wound complications in working-class populations [24]. Our identification of peritonitis, anemia, and malnutrition as key preoperative risk factors supports existing pathophysiological models of impaired wound healing [25]. The strong association with emergency surgery (79.3% of cases) aligns with global data showing 2-3 fold increased AWD risk in emergency versus elective procedures [26]. This likely reflects both the acute physiological stress of emergency conditions and limited opportunities for preoperative optimization [27]. The temporal pattern of AWD occurrence, peaking on postoperative day 6 with most cases between days 5-8, corresponds precisely with the critical phase of collagen remodeling and tensile strength development in wounds [28]. This finding reinforces the importance of vigilant monitoring during this vulnerable period, particularly for high-risk patients [29]. The dose-response relationship between risk factor quantity and

AWD likelihood (37.9% of cases having ≥4 factors) provides compelling evidence for cumulative risk models in surgical wound complications [30]. This supports the concept of preoperative risk stratification systems to guide individualized patient management [31]. The predominance of partial (83%) versus complete (17%) dehiscences matches typical patterns reported in literature [32], though our complete dehiscence rate appears higher than some contemporary series [33]. This may reflect challenges in early detection and intervention in resource-limited settings.

5. Limitations Of The Study

This study had limitations, including being confined to three tertiary hospitals, which may not represent the national scenario. Additionally, a short study period, limited patient numbers, and inadequate financial and infrastructural support affected the study's scope and precision.

6. Conclusion

Wound dehiscence was more prevalent in males, with the highest incidence observed in patients over 50 years of age. Most affected individuals had three or more preoperative risk factors, including peritonitis, anemia, and malnutrition. The likelihood of dehiscence increased with the number of risk factors. Although no single factor could be solely blamed, early identification and management of multiple risk factors may significantly reduce the incidence of wound dehiscence in high-risk patients.

Recommendation

Abdominal wound dehiscence is preventable, with multiple preoperative risk factors contributing to serious complications. Health education, early diagnosis, and timely intervention are essential. A longitudinal study with a larger sample size is recommended.

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