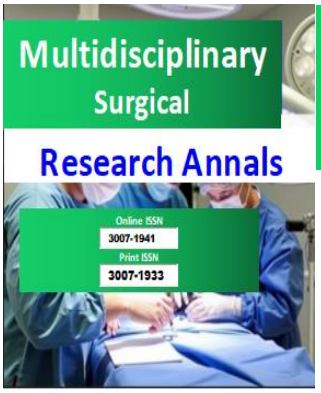

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https://msra.online/index.php/Journal/about
Vol. 2 No. 4 (2024)

ISSN Online: 3007-1941
ISSN Print: 3007-1933
Name of Publisher: EDUCATION RESEARCH ASSOCIATES
Journal Frequency: 4 Issue Per Year

Exploring the Knowledge, Attitudes, and Practices of Antioxidant Supplementation for Muscle Recovery among Physiotherapy Students

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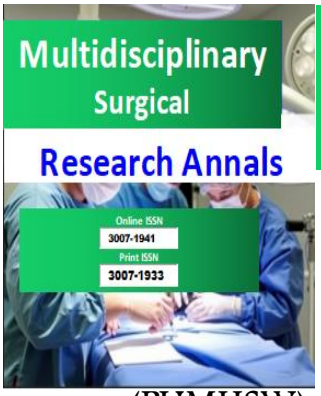
Abstract

Background: Antioxidant supplementation is widely recognized for its potential to reduce exercise-induced oxidative stress and enhance muscle recovery. However, there is limited research on the knowledge, attitudes, and practices regarding antioxidant supplementation among healthcare students, particularly physiotherapy students. Objective: This study aims to assess the awareness, knowledge, and practices regarding antioxidant supplementation for muscle recovery among physiotherapy students at the Institute of Physical Rehabilitation Sciences (IPRS), Peoples University of Medical and Health Sciences for Women



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https://msra.online/index.php/Journal/about
Vol. 2 No. 4 (2024)

ISSN Online: 3007-1941
ISSN Print: 3007-1933
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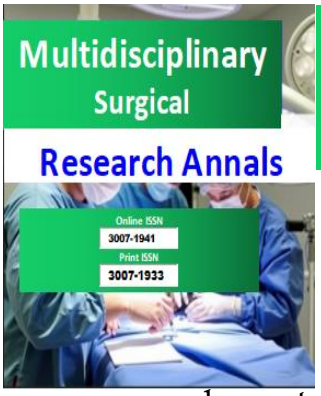
(PUMHSW). Methodology: A cross-sectional study was conducted with 300 physiotherapy students enrolled at IPRS, PUMHSW. Inclusion criteria required participants to be aged 18-28 years old and enrolled in the physiotherapy program. Exclusion criteria included students from other disciplines, non-consenting participants, and those with incomplete responses. A structured questionnaire was used to collect demographic information, awareness, knowledge, usage, and perceptions of antioxidant supplementation. Ethical approval was obtained from the Institutional Review Board, and informed consent was obtained from all participants, ensuring confidentiality. Results: A total of 300 students participated. The study found that 66.1% of participants were aware of antioxidants' role in reducing muscle soreness, but only 32% had used supplements. Despite moderate awareness, 58.7% felt their curriculum inadequately covered antioxidant supplementation. Approximately 70.4% expressed interest in receiving more formal education on antioxidants. The study highlighted significant gaps in knowledge and practice, emphasizing the need for enhanced education on antioxidant supplementation. Conclusion: The study revealed moderate awareness but limited knowledge and use of antioxidant



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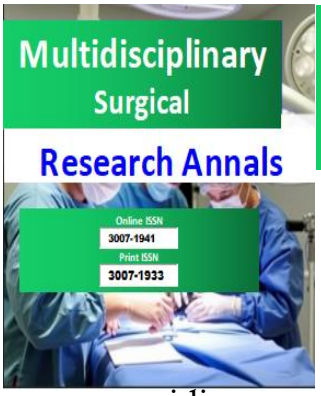
supplementation, suggesting the necessity for integrating evidence-based education into the physiotherapy curriculum to improve rehabilitation practices.

Keywords: Antioxidant supplementation, Muscle recovery, Knowledge and awareness, Rehabilitation practices, Healthcare Education

Introduction

Antioxidant supplementation has become a focal point in sports medicine and rehabilitation due to its potential to combat oxidative stress and promote muscle recovery following strenuous physical activity. Exercise-induced oxidative stress results from an imbalance between reactive oxygen species (ROS) and the body's antioxidant defense mechanisms. Excessive ROS can cause cellular damage, delayed recovery, and impaired athletic performance1,2. Antioxidants, including vitamins C and E, glutathione, coenzyme Q10, and polyphenols, have been extensively studied for their ability to neutralize ROS and aid in muscle recovery. Despite the growing interest and research in this field, the awareness and practical application of antioxidant supplementation, particularly among future healthcare professionals, remain underexplored. Physiotherapy students, given their critical role in



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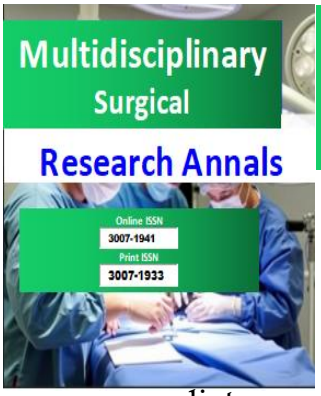
guiding recovery strategies, are an essential group for studying awareness and practices related to antioxidants2,3.

Internationally, several studies highlight the awareness and utilization of antioxidant supplementation. In a study conducted in the United States, 68% of athletes and sports science students were aware of antioxidants' role in recovery, with 35% incorporating supplements into their routines4. A European study in Spain revealed similar findings, with 64% of exercise science students reporting awareness and 40% using antioxidant supplements5. In Asia, a study in Japan noted that 55% of physiotherapy students recognized the role of antioxidants in reducing muscle soreness, although only 25% reported using supplements regularly6. Similarly, research in India highlighted that 59% of healthcare students were aware of antioxidant-rich diets, but only 18% actively supplemented for recovery purposes7.

In Pakistan, limited studies have explored the specific awareness of antioxidant supplementation among healthcare students. However, general surveys on nutrition literacy reveal low awareness of the physiological roles of antioxidants, with only 28% of medical and allied health students demonstrating adequate knowledge8. Moreover, a study



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ISSN Online: 3007-1941
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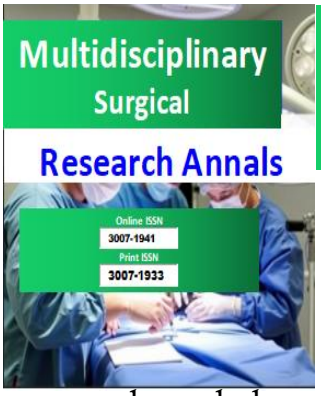
on dietary practices among physiotherapy students in Lahore found that less than 20% consumed antioxidant-rich diets or supplements to support recovery9. This gap in knowledge and practice underscores the urgent need for targeted educational interventions to enhance the understanding of antioxidants' benefits in rehabilitation and recovery.

This study aims to assess the awareness, knowledge, and practices of antioxidant supplementation among physiotherapy students at the Institute of Physical Rehabilitation Sciences (IPRS), PUMHSW. As future healthcare professionals, physiotherapy students' understanding of antioxidants is vital to ensure evidence-based guidance in patient recovery protocols. By investigating their current knowledge levels and supplementation practices, this study seeks to identify gaps and inform educational strategies to improve rehabilitation training. The findings are expected to contribute to the broader understanding of nutrition literacy among healthcare students in Pakistan, fostering better integration of antioxidants into physiotherapy and recovery practices

Methodology

Study Design

This cross-sectional study was designed to assess the awareness,



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knowledge, and practices of antioxidant supplementation for muscle recovery among physiotherapy students.

Study Setting

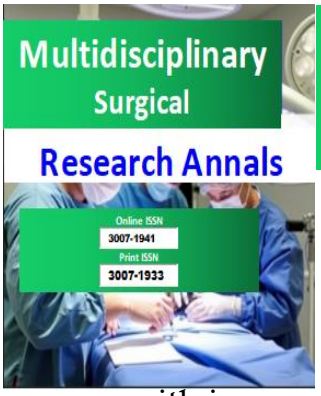
The study was conducted at the Institute of Physical Rehabilitation Sciences (IPRS), Peoples University of Medical and Health Sciences for Women (PUMHSW).

Sample Size

A sample size of 300 students was selected to ensure a comprehensive representation of physiotherapy students across different academic years, allowing for a detailed analysis of trends in knowledge, practices, and attitudes toward antioxidant supplementation.

Data Collection

Data was collected using a structured questionnaire that included sections on demographic information, awareness of antioxidants, supplementation practices, and perceptions regarding the effectiveness and risks of antioxidant use. Only physiotherapy students enrolled at IPRS, PUMHSW, who were 18 years or older, and who voluntarily consented to participate, were included in the study. Students from programs outside physiotherapy, those who did not consent, and those



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with incomplete survey responses were excluded from participation.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of PUMHSW. Informed consent was sought from all participants, ensuring that participation was voluntary. Confidentiality of participant information was maintained throughout the study, with data used solely for research purposes.

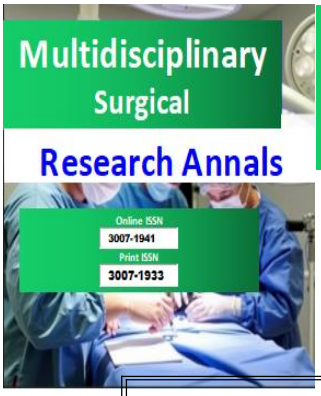
Data Analysis

Data was analyzed to assess levels of awareness, knowledge, and practices regarding antioxidant supplementation for muscle recovery. Statistical analysis was conducted to identify trends and differences based on academic year and demographic factors.

Results

A total of 300 participants responded to the survey. All the participants are female and the age distribution showed that most participants were in the 18–25 age group (72.3%).

Demographic Variable	Frequency (n)	Percentage (%)
Age Group		



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Demographic Variable	Frequency (n)	Percentage (%)
18–20 years	217	72.3%
21–22 years	60	20.0%
23–25	14	4.6%
25–29	9	3.1%

The survey revealed that 66.1% of participants (198 out of 300) were aware of the role of antioxidants in reducing muscle soreness, while 33.9% (102 participants) were not. Vitamin C (72%) and Vitamin E (55.2%) were the most commonly recognized antioxidants. Regarding knowledge of antioxidant supplementation, 53.1% of participants (159 participants) reported having learned about it, whereas 46.9% (141 participants) had not.

In terms of usage, a majority of participants (68.0%, 204 participants) reported never using antioxidant supplements. Among those who did use antioxidant supplements, 20.3% (61 participants) used them occasionally, 7.8% (23 participants) used them regularly (2–3 times per week), and 3.9% (12 participants) took them daily.

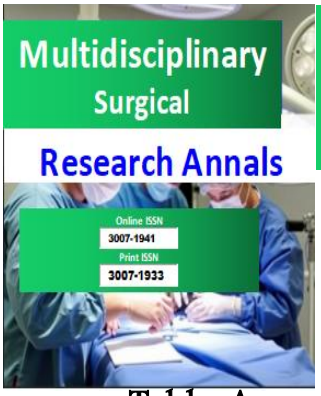

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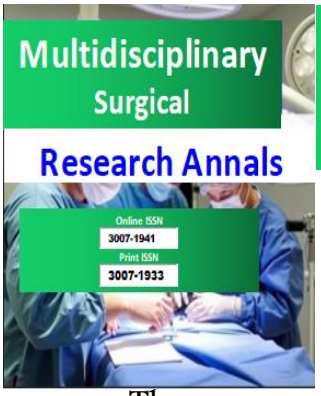
Table: Awareness, Knowledge, and Usage of Antioxidants

Question	Response	Frequency (n)	Percentage (%)
Are you aware that antioxidants reduce muscle soreness?	Yes	198	66.1
	No	102	33.9
Have you learned about antioxidant supplementation?	Yes	159	53.1
	No	141	46.9
Have you ever used antioxidant supplements?	Yes	96	32.0
	No	204	68.0
Frequency of Use	Occasionally	61	20.3
	Regularly (2–3 times/week)	23	7.8
	Daily	12	3.9



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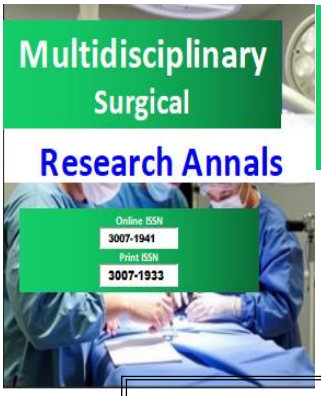
The survey revealed that 63.6% of participants (191 out of 300) agreed that antioxidants effectively reduce muscle soreness, while 17.8% (53 participants) were neutral, and 18.6% (56 participants) disagreed. Similarly, 57.6% (173 participants) believed protein supplements contribute to muscle recovery, whereas 22.9% (69 participants) were neutral, and 19.5% (58 participants) disagreed.

Regarding the perceived benefits of antioxidant supplements, reducing muscle soreness was the most commonly reported benefit (60.3%, 181 participants), followed by enhancing overall recovery (40.3%, 121 participants), boosting immune response (26.8%, 80 participants), and improving endurance (25.6%, 77 participants).

Table: Perceived Effectiveness and Benefits of Supplements

Question/Benefit	Response	Frequency (n)	Percentage (%)
Do you think antioxidants reduce muscle soreness?	Agree	191	63.6
	Neutral	53	17.8
	Disagree	56	18.6



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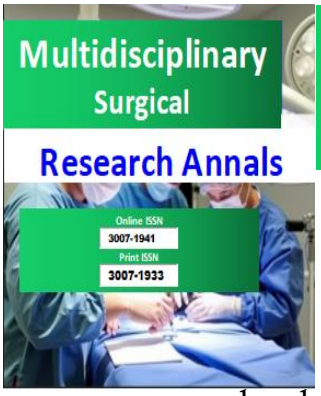
Question/Benefit	Response	Frequency (n)	Percentage (%)
Do protein supplements contribute to muscle recovery?	Agree	173	57.6
	Neutral	69	22.9
	Disagree	58	19.5
Perceived Benefits of Antioxidant Supplements	Reducing muscle soreness	181	60.3
	Enhancing overall recovery	121	40.3
	Boosting immune response	80	26.8
	Improving endurance	77	25.6

Regarding the curriculum, 58.7% of participants (176 out of 300) felt that antioxidant and protein supplementation topics were not well



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covered, while 27.8% (83 participants) believed they were adequately addressed, and 13.5% (41 participants) were unsure. Additionally, 70.4% of participants (211) expressed a desire for more formal education or training on these topics.

When asked about the risks associated with antioxidant supplementation, 47% (141 participants) were aware of potential dangers, including overconsumption leading to toxicity (24.4%, 73 participants), interference with muscle adaptation (15.6%, 47 participants), and adverse interactions with medications (6.8%, 20 participants). However, 38.2% (115 participants) identified no risks.

In terms of recommendations, 68.9% of participants (207) expressed a willingness to recommend antioxidant supplements to patients or athletes, with 50.0% (150 participants) strongly endorsing them and 22.3% (67 participants) advising their use with caution. Conversely, 14.4% (43 participants) would not recommend them, and 12.9% (39 participants) were unsure.

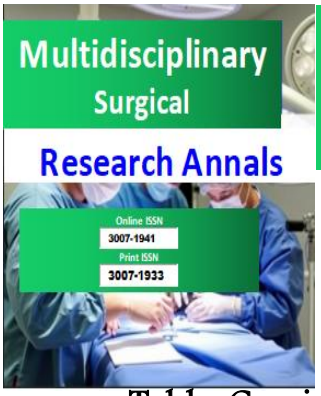

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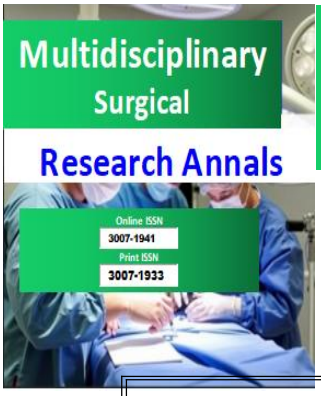
Table: Curriculum Coverage, Risks, and Recommendations

Question/Category	Response	Frequency (n)	Percentage (%)
Is the topic well-covered in your curriculum?	Yes	83	27.8
	No	176	58.7
	Unsure	41	13.5
Would you like more formal education/training?	Yes	211	70.4
	No	56	18.6
	Unsure	33	10.9
Perceived Risks of Antioxidant Supplements	Overconsumption leading to toxicity	73	24.4
	Interference with muscle adaptation	47	15.6
	Adverse interactions with medications	20	6.8



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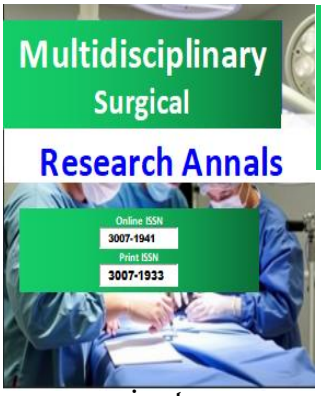
Question/Category	Response	Frequency (n)	Percentage (%)
	No risks identified	115	38.2
Recommendation of Antioxidant Supplements	Yes, definitely	150	50.0
	Yes, with caution	67	22.3
	No	43	14.4
	Unsure	39	12.9

Discussion

The study provides significant insights into the awareness, knowledge, and practices of antioxidant supplementation among physiotherapy students at the Institute of Physical Rehabilitation Sciences (IPRS), Peoples University of Medical and Health Sciences for Women (PUMHSW). Findings highlight notable gaps in understanding and application, aligning with broader international trends and contributing valuable data to the existing literature.

The level of awareness regarding antioxidants' role in muscle recovery, observed at 66.1%, is comparable to international studies. For



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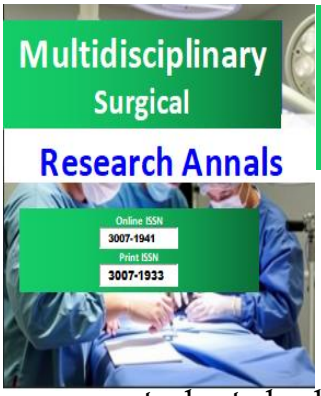
instance, a study by Madden (2022) reported that 68% of athletes and sports science students in the United States were aware of antioxidants' benefits10. Similarly, Bandyopadhyay et al. (2019) found that 59% of medical students in India were knowledgeable about protein supplementation, which often accompanies antioxidant discussions11. Despite the relatively moderate awareness levels, these results suggest a global gap in integrating antioxidant education into healthcare curricula.

Moreover, only 53.1% of participants in this study had formal knowledge of antioxidant supplementation, reflecting inadequacies in academic programs. This echoes the findings by Hernández et al. (2012), who criticized the limited experimental emphasis on antioxidants in sports and rehabilitation sciences curricula and advocated for evidence-based educational reforms12.

The low uptake of antioxidant supplementation in this study (32% participants) aligns with trends reported in India (18%) and Japan (25%) by Bandyopadhyay et al. (2019. The preference for natural dietary sources over supplements and misconceptions about risks may contribute to this hesitancy11. This study also found that 68% of



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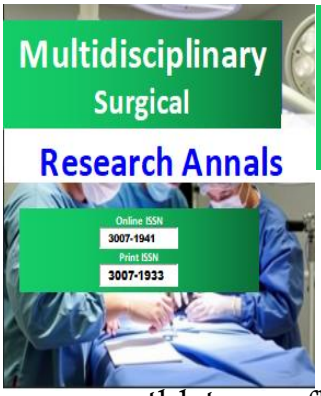
students had never used supplements, with only 3.9% taking them daily, suggesting potential barriers such as cost, lack of knowledge, or skepticism regarding efficacy.

Participants demonstrated mixed perceptions about the effectiveness of antioxidants, with 63.6% agreeing on their ability to reduce muscle soreness. Similar findings were reported in a randomized controlled trial by Martínez-Ferrán et al. (2023), which highlighted that antioxidant vitamins like C and E could modulate oxidative stress but cautioned against excessive use, which may interfere with muscle adaptation to training13.

Interestingly, 38.2% of participants perceived no risks associated with antioxidant supplementation, which contrasts with findings by Hernández et al. (2012), who emphasized potential downsides, including interference with endogenous antioxidant systems and delayed muscle recovery12. This discrepancy underscores the need for comprehensive education to bridge gaps in understanding risks and benefits.

Despite limited knowledge, 68.9% of participants expressed a willingness to recommend antioxidant supplements to patients or



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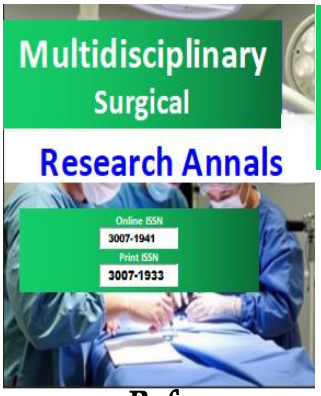
athletes, reflecting a need for evidence-based training. As Madden (2022) noted, healthcare students and professionals often rely on anecdotal evidence when making dietary supplement recommendations, highlighting the urgency of incorporating scientific literacy into their education10.

A majority (58.7%) of participants in this study believed that antioxidant supplementation was inadequately covered in their curriculum. This finding is consistent with Bandyopadhyay et al. (2019), who identified similar deficiencies in Indian medical colleges11. Furthermore, 70.4% expressed a desire for more formal education, emphasizing a gap between the academic curriculum and practical demands in physiotherapy and sports rehabilitation.

Conclusion

This study revealed moderate awareness but limited knowledge and usage of antioxidant supplementation among physiotherapy students at IPRS, PUMHSW. Significant gaps in education and training highlight the need to enhance the curriculum with evidence-based modules to better equip students for effective rehabilitation practices.



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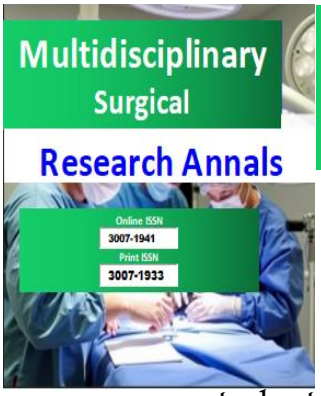

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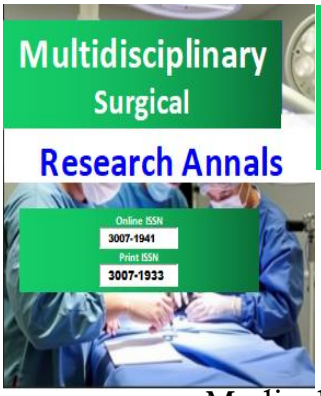

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Vol. 2 No. 4 (2024)

ISSN Online: 3007-1941
ISSN Print: 3007-1933
Name of Publisher: EDUCATION RESEARCH ASSOCIATES
Journal Frequency: 4 Issue Per Year

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