Kingdom Of Saudi Arabia
Ministry Of Education (280)
General Directorate of Education in Jeddah
Private Education Office
Stage 3 and 4
Academic Year : 2025 - 2026

Girls' International Section

المملكة العربية السعودية
وزارة التعليم (٢٨٠)
الإدارة العامة للتعليم بمحافظة جدة
مكتب التعليم الخاص
قسم المتوسط والثانوي
العام الدراسي 1446 هـ

02/09/2025

Subject: Congratulations to Our Student, Semah Fatani, on Research Publication

Dear Ms Awatef.I. Murad

I am delighted to share some wonderful news regarding one of our outstanding students, Ms. Semah Fatani. She has recently published a research article in the International Education and Research Journals (IERJ), an accomplishment that highlights her academic dedication, intellectual curiosity, and perseverance.

This achievement is a matter of great pride not only for Semah but also for our school community, as it reflects the spirit of excellence we encourage and nurture among our students. Her contribution to research at such a young age sets a remarkable example for her peers and further enhances the reputation of our institution.

We sincerely congratulate Semah on this milestone and wish her continued success in her academic journey. I believe it would be a wonderful gesture for the school to recognize and celebrate her achievement.

Warm regards,

Nishina Bijesh

2/9/25

Approved By

Ms Aisha Murad

N.B. journal attached for your reference.

Gmail Nishina <nishnabijesh21@gmail.com>

Fwd: Research Scholars Program by Harvard Student Agencies | Request for Meeting

1 message

Nishna Kp <kpnishna@gmail.com> Thu, Feb 13, 2025 at 7:54 PM
To: nishna bijesh <nishnabijesh21@gmail.com>

---------- Forwarded message ---------
From: **Stella Clark** <stella@joinspeakup.com>
Date: Wed, 29 Jan 2025 at 17:08
Subject: Research Scholars Program by Harvard Student Agencies | Request for Meeting
To: <kpnishna@gmail.com>

Dear Nishna Bijesh,

Greetings from Learn with Leaders!

We are thrilled to present an exceptional opportunity for students in Grades 8 to 12—the **Research Scholars Program by Harvard Student Agencies, now available in February & May 2025.** This unique program is designed to introduce students to the fundamentals of research and research writing, guided by expert mentors from Harvard Student Agencies.

We would love to discuss this opportunity further with you on **3rd/4th February at 10 am.** If this time doesn't work for you, please suggest an alternate time, or feel free to schedule a meeting here: https://t.ly/502Bi

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About the Program

The Research Scholars Program offers students a deep dive into research methodologies, covering essential topics such as forming hypotheses, research writing formats, finding accurate sources, conducting primary experiments, literature review, and more. **Over the course of eight weekends, students will develop their own thesis, produce a 1500-2000 word research report, and present their findings.** The program covers diverse research areas, including STEM, Arts and Humanities, Law, Entrepreneurship, and more.

Why This Program?

- **Comprehensive Learning:** Students will gain a thorough understanding of research fundamentals, exploring topics that resonate with them.
- **Expert Guidance:** Participants will receive mentorship from qualified Harvard Student Agencies mentors, guiding them through the research process.
- **Real-World Application:** Engage in research across various fields and produce a publishable research report.
- **Skill Development:** Enhance critical thinking, research, and writing skills through project-based learning.
- **Publication Opportunity:** Research reports may be published on the Harvard Student Agencies website and in a journal, subject to acceptance.
- **Certificates:** Receive a certificate from Harvard Student Agencies, along with access to all Learn with Leaders webinars and masterclasses, boosting your academic profile.

This time, we are opening the applications for 2 cohorts - February & May 2025. So now students have the flexibility to join the cohort of your choice!

The February 2025 Cohort

Program Starts: 23rd February 2025
Who Is Eligible?: Students from Grades 8 to 12
Duration: 8 weekends

Regular Program Fee: USD 1000

Program Fee for your school: 650 USD

Application Deadline: 15th February 2025
Find more about the Program: Here
Application Form (February): Click Here

The May 2025 Cohort

Program Starts: 11th May 2025
Who Is Eligible?: Students from Grades 8 to 12
Duration: 8 weekends

Regular Program Fee: USD 1000

Program Fee for your school: 650 USD

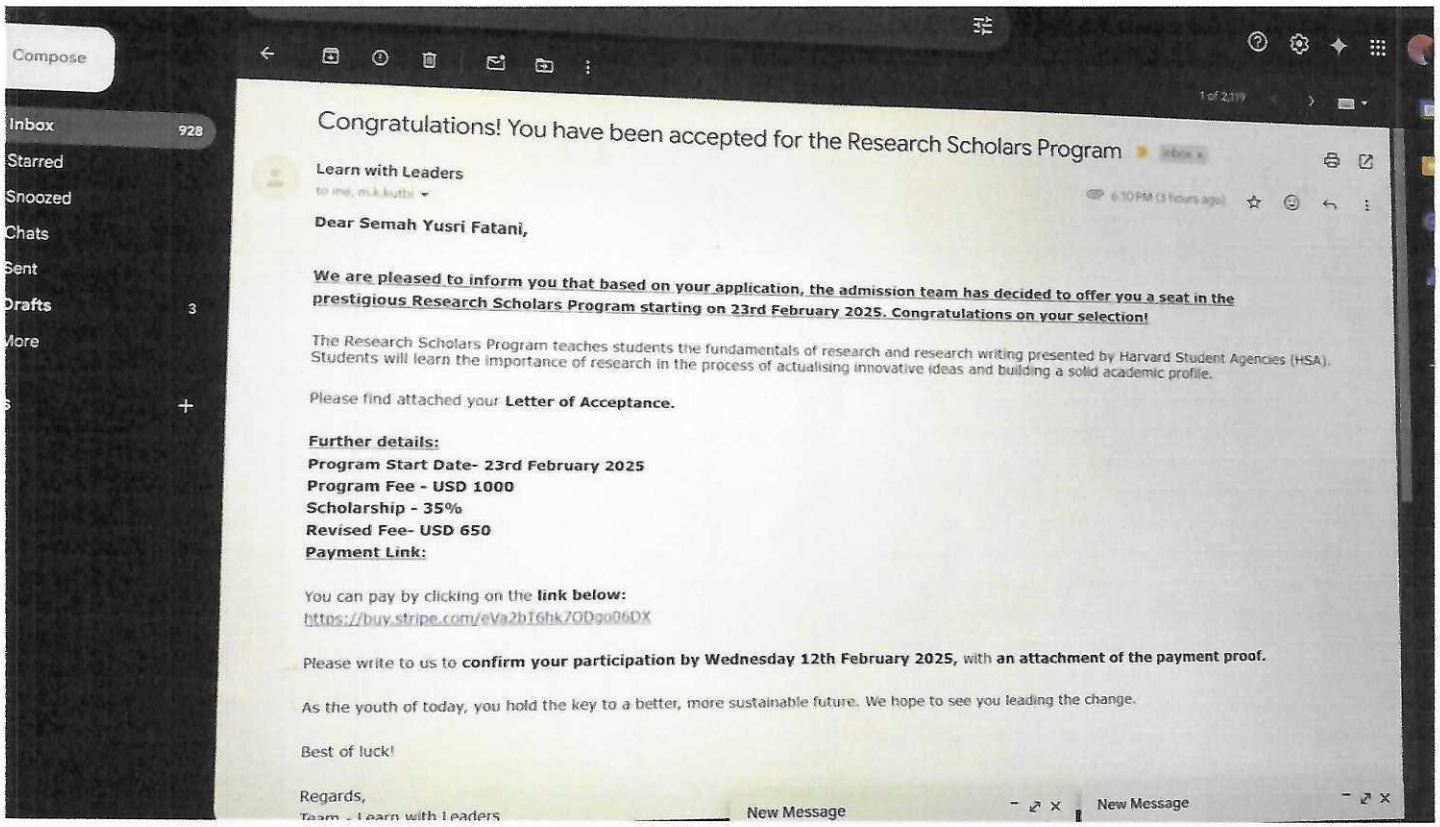
Application Deadline: 30th April 2025
Find more about the Program: Here
Application Form (May): Click Here

If you have any questions, please feel free to reach out to us at team@learnwithleaders.com.

We look forward to your students being part of this transformative program!

Best regards,

Learn with Leaders



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Starred
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Chats
Sent
Drafts 3
More

Congratulations! You have been accepted for the Research Scholars Program

Learn with Leaders

Dear Semah Yusri Fatani,

We are pleased to inform you that based on your application, the admission team has decided to offer you a seat in the prestigious Research Scholars Program starting on 23rd February 2025. Congratulations on your selection!

The Research Scholars Program teaches students the fundamentals of research and research writing presented by Harvard Student Agencies (HSA). Students will learn the importance of research in the process of actualising innovative ideas and building a solid academic profile.

Please find attached your **Letter of Acceptance.**

Further details:
Program Start Date- 23rd February 2025
Program Fee - USD 1000
Scholarship - 35%
Revised Fee- USD 650
Payment Link:

You can pay by clicking on the **link below:**
https://buy.stripe.com/eVa2bT6hk7ODgo06DX

Please write to us to **confirm your participation by Wednesday 12th February 2025,** with **an attachment of the payment proof.**

As the youth of today, you hold the key to a better, more sustainable future. We hope to see you leading the change.

Best of luck!

Regards,
Team - Learn with Leaders

New Message

New Message

Research Article | Education | E-ISSN No : 2454-9916 | Volume : 11 | Issue : 8 | August 2025

THE IMPACT OF CHRONIC STRESS ON ADOLESCENT IMMUNE FUNCTION: A MIXED-METHODS INQUIRY INTO PHYSIOLOGICAL AND PSYCHOLOGICAL INTERACTIONS

Semah Yusri Fatani

Research Scholars Program, Harvard Student Agencies, In collaboration with Learn with Leaders

ABSTRACT

For decades, scientists and doctors have studied how psychological health impacts physical well-being, particularly focusing on how stress and other forms of psychological distress affect the body over time. While much of this research has focused on adults, there remains a significant gap in understanding how these factors affect adolescents. Adolescence is a critical period of development, and the effects of chronic stress during this time can have lasting consequences on both mental and physical health. This paper explores the relationship between chronic stress and the immune system in adolescents, an area that has received limited attention in scientific research. Chronic stress is known to alter immune function, potentially increasing susceptibility to infections and diseases. To address this gap, the paper examines pre-existing data and introduces new data gathered through a questionnaire aimed at adolescents aged 13 to 19. By analyzing this data, the study attempts to trace patterns in how chronic stress impacts immune function in young people.

KEYWORDS: Chronic Stress, Adolescents, Immune Function, HPA Axis, Psychosomatic Health, Cortisol

INTRODUCTION

Stress, from the Latin word *'strictus'* means drawn tight. It is the feeling of emotional strain or mental tension caused by a difficult situation or the natural state of worry that any individual might experience (WHO, 2025). While stress is a normal part of our day-to-day lives, it can have adverse effects on our bodies if it becomes excessive. The adolescent period of growth is when we are the most vulnerable to stressors (Mousikou et al., 2021). Research states that more than two-thirds of adolescents suffer from stress, whether it be moderate, severe, or extreme (Al-amera et al., 2024). This can negatively impact their growth through the modulation of hormones or other factors (Mousikou et al., 2021). Despite the growing body of research on stress and its impact on mental health, little is known about the long-term effects of chronic stress on the immune system function in adolescents.

The immune system is the body of organs, tissues, and cells that coordinate to fight off infectious pathogens in our body. Hans Selye proposed the concept of stress in the 1950s (Szabo et al., 2012). He discovered that stress causes the atrophy of the thymus, a crucial organ for adaptive cellular immunity (ScienceDirect, n.d.). Hans Selye proposed the idea that stress can affect the immune system, stating that stress can shrink the thymus, which is an essential organ for immune function, and activate the HPA axis, which produces glucocorticoids in the blood. Glucocorticoids in the blood stop the immune system responses (Ishikawa & Furuyashiki, 2021). Immune responses can be through active or passive immunity. Although stress can positively influence our short-term immune system, it can have harmful long-term effects if kept untreated over an extended period of time.

LITERATURE REVIEW

This paper traces the development of how chronic stress can impact the immune system in adolescents. As this is an area that has not been extensively researched, limited sources were available for review. However, the sources that were found revealed a clear pattern in the data, highlighting both consistent trends and notable differences. These studies point to significant links between chronic stress and alterations in immune function, though they also show variations in how these effects are influenced by stressors and other individual factors. The existing data provides valuable insights into the potential long-term consequences of chronic stress on adolescent health, underscoring the need for further exploration in this critical area.

Author 1 found that during stressful periods, adolescents are more likely to experience a change in immune function, which can hinder wound healing and increase resistance to infections. Author 2 expanded on this by discussing that stress causes immune cells like monocytes and macrophages to develop glucocorticoid resistance, disrupting normal inflammatory responses. Both studies believe that the role of cytokines in the immune system causes disturbance to the immune system due to stress. All authors agreed that chronic stress can lead to long-term health problems, such as cardiovascular diseases and autoimmune disorders, due to persistent immune system imbalance.

While Author 1 and Author 2 explored similar topics, they differed in their focus. Author 1 concentrated on the role of the HPA axis and how chronic stress affects specific diseases, while Author 2 delved into the behavior of immune cells and their neurological effects under stress. Additionally, both Author 2 and Author 3 agreed on the connections between the immune

system. the brain. and the nervous system. emphasizing the need for further research in this area.

Despite the various perspectives presented across the sources. they all reached a common conclusion: there is a lack of extensive information on the topic of chronic stress and its impact on the immune system in adolescents. This gap in research highlights the need for further investigation into this critical area.

METHODOLOGY

This study adopts a mixed-methods approach with a qualitative and quantitative orientation. relying on both secondary literature and primary survey data to investigate how chronic stress affects immune function in adolescents. A structured questionnaire was disseminated digitally to individuals aged 13–19 via social media platforms to maximize reach and participation. The survey included both closed-ended questions for quantifiable data and open-ended questions for subjective insights. Quantitative responses were represented using pie charts to visualize the distribution of self-reported stress-related symptoms. while qualitative responses were thematically categorized based on relevance to immune system function and psychosomatic indicators. In total. 15 anonymous responses were collected and analyzed.

Justification for Methodology: Given the ethical sensitivity of working with adolescents and the complex nature of stress as a biopsychosocial construct. a mixed-methods. primarily qualitative approach was best suited. It enables both measurable trends and subjective interpretation to emerge. offering a holistic view of adolescent experiences of stress-related immune responses.

RESULTS AND DISCUSSION

At the end of the data collection. 15 responses were obtained anonymously. answering whether adolescents feel that their immune system is affected by chronic stress or not. Quantitative data was visualized using pie charts (see Figures 1. 2. and 3 below). and qualitative data was organized based on its importance.

Figure 1

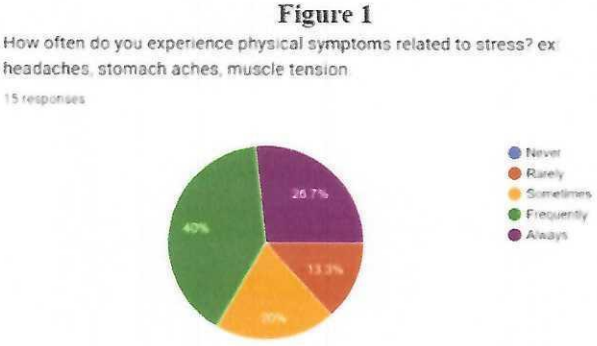
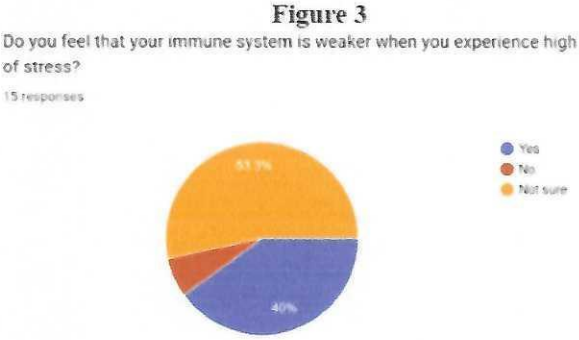


Figure 2

Figure 3



According to the information gathered. 40% of adolescents frequently experience physical symptoms that relate to stress. and 26.6% always experience physical symptoms related to stress. 33.3% of individuals get sick when feeling stressed. whether it's the feeling of nausea. headaches. or chest pains. Almost all individuals stated that they have difficulty breathing. which relates to the high cortisol levels in the blood due to the HPA axis being activated. Others felt nauseous and had stomach pain. which could be due to the unbalanced pH levels in the stomach after stressful situations. Another factor most questionnaire takers stated was that they would get headaches. which confirms that stress does affect neural functions. However. when asked whether the participants feel that their immune system is weaker when they experience high levels of stress. 53.3% responded with not sure. 40% said yes. and 6.7% said no. These can be explained by exploring the following relationships:

Chronic Stress and Immunity

When the body is under stress. it activates the HPA axis. When the HPA axis is in function. it stimulates an increase in the release of glucocorticoids. hormones produced from the adrenal gland. into the blood. This hormone prevents inflammatory responses by acting on myeloid and lymphoid cells. which are immune cells. However. after experiencing a stressful situation. monocytes and macrophages develop glucocorticoid resistance. thereby disinhibiting inflammatory responses. Other than preventing inflammatory responses. glucocorticoids promote the breakdown of lipids. carbohydrates. and proteins. leading to an increase in blood glucose level. which could cause harmful long-term effects to the body. Moreover. stress can affect gene transcription by binding to the glucocorticoid receptor. which regulates immune responses. Chronic stress has only been shown to disrupt the production of proinflammatory cytokines. which are essential for wound healing. Not only does chronic stress suppress immune responses. but it also slows healing

processes. For instance, studies show that if adolescents who show stress-like behaviors take vaccines, it can suppress immune responses, as T-cell responses to antiviral vaccinations are modulated.

Chronic Stress and Neural Functions

Stress-induced neuroinflammation has been explored since the discovery that stress induces the expression of proinflammatory cytokines. Cytokines regulate the mobilization of neutrophils and monocytes, immune cells. Monocytes become harmful to the brain if produced in excess. It gets into the brain through the blood-brain barrier and can disrupt neural functions. In addition, chronic stress activates microglia in specific parts of the brain, which is where most inflammatory responses are derived from microglia and resistant macrophages. TLR2/4 is involved in cytokine release in the prefrontal cortex: it coordinates multiple inflammatory responses derived from the microglial activation, promoting depressive-like behavior. Studies show that depressive patients express abnormalities in innate immune systems in the periphery and brain, as exemplified by an increase in neutrophils, monocytes, and inflammatory mediators in the blood and neuroinflammation in specific areas of the brain, visualized by PET imaging. This proves that the immune system, chronic stress, and the nervous system interconnect.

Chronic Stress and Chronic Diseases

When the HPA axis is activated and glucocorticoids are released, cholesterol levels increase. High cholesterol levels cause blood clotting in veins, which increases the risk of heart attack and stroke. Also, stress released can increase blood pressure, leading to other chronic cardiovascular diseases such as coronary artery disease. Not only do glucocorticoids affect the heart, but they also affect the pathogenesis of T2DM, which makes the body resistant to insulin, resulting in obesity and diabetes. Fetal exposure to high concentrations of maternal glucocorticoids has been associated with low birth weight and cardiovascular diseases as the adolescent grows. Chronic stress can also cause cancer if it becomes too extreme. When chronic stress increases inflammation and alters immune responses, it may increase susceptibility to certain types of cancer by suppressing type 1 cytokines and protective T-cells and increasing suppressor T-cell functions. Other than the chronic diseases stated, chronic stress can also affect adolescents' growth and gut health.

CONCLUSION

This study explored the relationship between chronic stress and immune function in adolescents, revealing a clear link between prolonged psychological stress and weakened immune responses. As adolescents navigate critical developmental stages, consistent exposure to stressors—whether academic, social, or familial—can disrupt hormonal balance, particularly by elevating cortisol levels. This hormonal imbalance can suppress immune activity, making teens more susceptible to illness, inflammation, and even long-term health complications. The findings of this research should encourage adolescents to navigate through their stress and get help if necessary, before long-term consequences.

In the future, AI devices should be invented to help regulate and manage chronic stress without the need to go to the hospital on a daily basis. This can help patients and doctors by decreasing the percentage of people who are diagnosed with chronic diseases due to chronic stress from the patients' day-to-day lives. In a time where stress is increasingly normalized in teen life, acknowledging its biological consequences is a crucial first step toward meaningful change.

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