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Lifestyle and physical activity habits among Arab-speaking adults

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Research Article

Keywords: Physical activity level, Stress, Sleep quality, Diet quality, Arabic speaking

Posted Date: July 27th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10457005/v1

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Additional Declarations: No competing interests reported.

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Abstract:

Background:

Physical inactivity is associated with excess weight and adverse health outcomes. According to evidence, Arab populations engage in low levels of physical activity. We endeavour to assess current physical activity, sleep quality, diet, and stress levels in the Arab world.

Method:

A total of 4367 adults, 49% males and 51% females (Age: 29.4±12.1 years, Mass: 67.5±14.1 kg, Height: 165.8±14 cm) took part in this study. The study population were divided into 4 age groups, 18-29, 30-44, 45-55 and older than 55. Online self-reporting questionnaires were used to assess the level of activity, stress level, diet, and quality of sleep of the participants.

Results:

There was a significant difference in the level of physical activity ($p = 0.00$), perceived stress ($p = 0.002$) and eating habit ($p = 0.002$) among the age groups. Females had significantly higher BMI, high score STC, low sleep Quality, and a high level of inactivity compared to males. On the other hand, males are more stressed than females ($p = 0.02$).

Conclusion:

These findings highlight the need for strategies to increase physical activity and decrease sedentary behaviour in Arab adults in order to create a good and healthy lifestyle.

Keywords: Physical activity level, Stress, Sleep quality, Diet quality, Arabic speaking

Introduction:

Inactivity, poor sleep quality, stress resilience, and poor eating habits have all been major sources of concern for health officials in most Arab countries and around the world. This is due to the fact that these factors are the root causes of many chronic illnesses. Many studies have shown that those who live a healthy lifestyle, such as eating a well-balanced diet, getting enough sleep, exercising regularly, and managing stress, experience a variety of health benefits, including a longer lifetime (e.g., Al-Yaaribi & Jabri, 2022; Farhud, 2015; Gadie et al., 2017; Hallal et al., 2012). According to Chudasama et al., (2020) a healthy lifestyle can improve life expectancy by 6-7 years in middle-aged people with a variety of chronic conditions.

Healthy eating habits have been linked to a lower risk of disease. Fruit and vegetable consumption, for instance, has been associated to a lower risk of heart disease, stroke, cancer, and type 2 diabetes (Aune et al., 2016; Juraschek et al., 2020; Zheng et al., 2020). Physical activity has also been demonstrated to be essential for leading a healthy lifestyle (Alotaibi and Boukelia, 2021). However, inactivity and excessive sedentary time have been linked to an increased risk of illness and mortality (Ekelund et al., 2019). Ekelund et al. (2020) found that those who engaged in at least 11 minutes of moderate-to-vigorous physical activity daily had a lower risk of death. According to a study, sedentary people who become physically active increase their immune systems and become less susceptible to infections (Papacosta and Gleeson, 2013).

Stress resilience is another key component that contributes to a healthy lifestyle. Stress has been related to several health consequences and disorders, including cancer, diabetes, and cardiovascular disease, as well as a poor diet and inactivity (Afrisham et al., 2019; Baritaki et al., 2019; Kim et al., 2021). Stress has long been recognised as a factor in the development of poor mental health and well-being (Pizzagalli et al., 2007).

As a result, sleep quantity and quality have a significant impact on alertness and coping with daily tasks, and it has been linked to morbidity and mortality (Kripke et al., 2002). Sleep durations have been shown to be negatively/positively linked with cognitive function and mood in epidemiological research (Ong et al., 2016). Research shows that in the Arab world, only 40% of men and 27% of women reported being physically active for at least 150 minutes per week, according to Mabry et al. (2010); with 75% of those aged 60–69 reported insufficient physical activity. This research aims to quantify current physical activity, sleep quality, diet and stress within the Arab world and identify opportunities to gain a healthy lifestyle.

Methods

Ethical approval

This study was approved by the Qassim University, Ethical approval number 07/22. The research was conducted in compliance with the 1964 Helsinki Declaration and its subsequent revisions, as well as related ethical standards.

Study setting and participants:

This study was approved by the Qassim University, Ethical approval number 07/22. The research was conducted in compliance with the 1964 Helsinki Declaration and its subsequent revisions, as well as related ethical standards. The study included people from 15 Arab countries: Saudi Arabia, Oman, Jordan, Bahrain, Iraq, Lebanon, Palestine, Syria, UAE, Egypt, Sudan, Libya, Tunisia, Algeria, and Morocco. The study comprised 4367 adults (males: n = 2140) aged ≥18 years, with the average of age: 29.4±12.1 years, weight: 67.5±14.1 kg, and height: 165.8±14 cm. All data was collected in July, August, and September of 2021. Informed written consent was obtained from all participants in the study.

Data collection tools and approaches:

Four online self-reporting questionnaires were used to measure the lifestyle behaviours of the research population in this study. Firstly, the International Physical Activity Questionnaire (IPAQ) short form was used to determine the level of physical activity (Qahoush et al. 2010). The Perceived Stress Scale (PSS) was employed to examine stress perception, (Cohen et al., 1983). The Pittsburgh Sleep Quality Index (PSQI) was utilised to examine sleeping habits, (Attal et al., 2021). Finally, the Starting The Conversation (STC) tool was used to assess eating habits (Paxton et al., 2011).

Measurement of physical activity:

The IPAQ short-form format was used to assess physical activity. The questionnaire includes seven questions that ask about the length and intensity of physical activity during the past seven days. To classify populations in IPAQ, three levels of physical activity are used: low, moderate, and high intensity. To calculate the level of activity, we utilised the same procedure as Craig et al. (2003), as shown below:

-Walking MET-minutes/week = 3.3 * walking minutes * walking days

-Moderate MET-minutes/week = 4.0 * moderate-intensity activity minutes * moderate days

-Vigorous MET-minutes/week = 8.0 * vigorous-intensity activity minutes * vigorous-intensity days.

-Total physical activity MET-minutes/week = sum of Walking + Moderate + Vigorous MET *minutes/week scores.

Categorical Score:

Low: This is the lowest level of physical activity, with individuals scoring less than 600 MET minutes per week.

Medium: Individuals who engage in at least 600 MET-minutes of total physical activity per week.

High: Individuals who engage in at least 3000 MET-minutes of total physical activity per week.

Measurement of perceived stress:

Participants' perceived stress was measured using the Perceived Stress Scale (PSS) (Cohen et al., 1983). The 10-item questionnaire is designed to assess perceived stress in young people and adults over the age of 12. It assesses an individual's perception of life over the previous month as unpredictable, uncontrollable, and overburdened. These questions focus on feelings and thoughts from the previous month. Individual PSS scores range from 0 to 40, with higher scores indicating greater perceived stress. Scores ranging from 0 to 13 indicate low stress, scores ranging from 14 to 26 indicate moderate stress and scores ranging from 27 to 40 indicate high perceived stress.

Measurement of sleep habits:

The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep habits (Buysse et al., 1989). The PSQI is a self-administered tool used to evaluate sleep quality and possible disorders in the previous month. It distinguishes "poor" from "good" sleep quality by measuring seven areas (components) over the last month only: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction.

The PSQI is scored using seven component scores ranging from 0 (no difficulty) to 3 (extreme difficulty). The component scores are added together to produce a global score (range 0 to 21). Higher scores denote poorer sleep quality. A global sum of ‘5’ or greater indicates a ‘poor’ sleeper.

Measurement of diet habits:

The Starting The Conversation (STC) questionnaire was used to assess dietary habits (Paxton, 2011), and is a simplified screening instrument designed for assessing dietary patterns. It consists of an eight-item questionnaire that focuses on assessing participants' dietary patterns. STC evaluates the frequency of fast-food meals, fruit, vegetables, regular soda or sweet tea, beans, chicken, fish, regular snacks chips or crackers, desserts/other sweets, margarine, butter, or meat/fat consumption. Each response is graded on a scale of 0 to 2. STC is graded by adding up the responses to each of the eight items (range from 0 - 16). Higher numbers indicate a less healthy diet, while lower numbers indicate a healthier diet.

BMI measurement:

Individuals self-reported their body mass and stature. Body mass index (BMI) was calculated using the formula: body mass (kg) /stature (m)2. As part of the anthropometric data collection, participants were also requested to provide their blood type.

Statistical Analysis:

Prior to statistical analysis, all data were checked for normality. Paired sample T tests were used to determine significance difference in the total population and within different age groups (SPSS20 Statistical Software, IBM.UK). Data was analysed using two-way repeated measure ANOVA with Bonferroni-adjusted, post hoc test to determine the difference at which age range group. Statistical significance was accepted at $P < 0.05$. Results are represented as mean values ± standard deviation (SD).

Results:

Overall, weight and height of males are higher than females and increased with age group, except for the oldest age group which had less body weight than the 45-54 age group (Table 1).

Table 1:

Figure 1:

The O+ blood type is the most common among the participants in this study (34.7%). The blood type AB- (0.4 % of the population) is the most uncommon. (Figure 1).

Body mass index:

Figure 2:

There was a significant difference in BMI between men and women in the 30-44 age group ($F_{3,183} = 25.4$, $p = 0.00$, $\eta^2 = 0.3$). However, when the same gender is compared over the four age categories, the results show a significant difference of BMI in both male and female genders ($F_{3,189} = 12.7$, $p = 0.00$, $\eta^2 = 0.17$ for female, $F_{3,408} = 32.1$, $p = 0.000$, $\eta^2 = 0.2$ for male). There was a correlation between the age groups and BMI ($p = 0.00$). Females above the age of 55 had the highest BMI, while males between the ages of 45 and 54 had the highest. The lowest BMI values were found in both males and females between the ages of 18 and 29. The rise in BMI is visible in both genders, with rises of 24% and 23.5% for males and females, respectively (Figure 2).

Table 2:

Table 2 shows that 58.5% of the individuals were in the "Overweight and class 1, 2, and 3 obesity" category of the BMI distribution (59% male and 58% female). For both genders, the age group 45-54 has the highest prevalence of overweight people (56% for male and 44% for female).

Figure 3:

A significant difference in the sum of STC is seen by age group ($F_{4,172} = 2.91$, $p = 0.02$, $\eta 2 = 0.09$), as shown in Figure 3. The Bonferroni corrected test showed a significant difference between the age groups 30-44 and 55 & older, as well as the other groups ($p = 0.003$ and 0.039, respectively).

Table 3:

Females between the ages of 18 and 29 and men between the ages of 30 and 44 have the poorest diets of any age group (Table 3). Neither age nor gender (18-29 and 30-44) has demonstrated any statistically significant difference in STC. People aged 55 and older have the healthiest diet. Overall, males adopt a healthier diet than females ($p = 0.00$).

Table 4:

In the sum of STC, there was a statistical difference in fast food, vegetable, bean, and chip consumption among the age groups (Table 4). Furthermore, the STC items and summary score reveal a statistical difference in the age groups ($F_{4,192}=4.63$, $p=0.001$, $\eta^2=0.08$), with older population eating more fruit, vegetables and beans and less desserts, sodas, fast food, and chips than the younger population ($p = 0.001$).

Sleep quality:

Figure 4:

PSQI scores are added together to produce a global score (range 0 to 21). Higher scores denote poorer sleep quality. All age groups had a mean global score of greater than 5, indicating poor sleep quality. The worst sleep quality was observed for the 30-44 age group ($F_{3,579} = 22$, $p = 0.00$, $\eta^2 = 0.10$). Whereas, in the 55 plus age range, greater sleep quality was recorded when compared with other age groups (Figure 4).

Table 5:

There was a significant difference in sleep quality between male and females in each of the four age groups ($p=0.00$). Overall, males had a higher quality of sleep than females ($F_{2,324}=8.37$, $P=0.00$, $\eta^2=0.49$). Sleep quality has been found to be worse in males aged 30-44 and females aged 18-29 and 30-44 (Table 5). The findings indicate that the overall sleeping pattern does not differ across the age groups depicted in Table 6. However, the only change that has occurred is around sleep disorders, where a statistically significant difference has been demonstrated ($F_{4,168} = 2.89$, $p = 0.024$, $\eta^2 = 0.065$).

Perceived Stress:

Figure 5

Overall, individuals reported moderate levels of stress (Figure 5). When evaluating the difference across groups, the Bonferroni corrected test revealed individuals between the ages of 30 and 44 encounter elevated levels of stress in comparison to other age groups ($p = 0.014$ and 0.006, respectively). There was no change in PSS across gender and health status ($p = 0.225$ and $p = 0.229$, respectively).

Figure 6:

A significant difference between blood type and PSS score has been demonstrated among the study population ($p = 0.00$). The age group of 30-44 has demonstrated the highest level of stress. Participants with A- and AB+ shows the high perceived stress; with participants having O+ showing the lowest mean stress score (Figure 6).

Table 7:

There was a significant difference in stress levels between the sexes from the overall age group ($p=0.02$). Males scored higher level of stress than females in the 30-44 and 45-54 age groups. Females aged 18-29, on the other hand, had a higher stress level than males in the same age range. However, there was no significant different between male and female in the 55 & older age group.

Table 8:

Participants reported high levels of perceived stress in 34.7% of cases. The results indicated that the age group between 30 and 44 experienced the highest level of perceived stress ($P=0.00$), which was statistically significant. The age group of 55 and older exhibited the lowest level of stress with 60.6% had a level of stress that ranged from moderate to low (Table8).

Level of activity:

Figure 7:

Physical activity was assessed using the IPAQ questionnaire, which categorises physical activity into three levels: low, moderate, and high. In this study, the high-activity corresponds to only 4% of the total survey population. The lowest degree of high activity was found in the 30-40 age group (0.2%). Age 45-54 is the most inactive age group, with 74% of those in this age range being classed as inactive. In comparison to the other age groups, those aged 18 to 29 are more likely to engage in high intensity and moderate intensity exercise (Figure 7). 60% of males and 50% of females were involved in a weekly exercise plan that ranged from moderate to intensive.

Figure 8:

In comparison to males, females show a lower level of activity in all age categories ($p = 0.00$, Figure 8: A, B, C, D, E). Both females and males aged 45-54 were the least active (61% and 49%, respectively, and Figure 8C). Greatest amount of physical activity was recorded for females aged 18-29 and males aged 30-44 in the moderate physical activities, (47% and 64%, respectively, and Figure 8A and 8B).

Discussion:

The current study examined physical activity levels, sleep quality, eating habits, and stress levels among Arab-speaking adults, all of which are key factors of living a healthy lifestyle. This study's findings support previous research that found significant correlations between physical activity level and other lifestyle habits and practises such as stress management, sleep quality, dietary habits, and BMI level (Powell et al., 2018; Reiner et al., 2013). Research has shown that 60% of the factors influencing an individual's health and quality of life are related to the individual's lifestyle (Farhud, 2015).

Both male and female participants in the current study are classified as overweight (25.7 kg/m2 for male and 26.4 kg/m2 for female) (Abarca-Gómez et al., 2017). It has been shown that Arab-speaking countries have one of the highest rates of obesity in the world, which has

become one of the region's most significant concerns (ALNohair, 2014). In this study 19% of the participants were obese especially for those aged 45 to 54. Obesity prevalence increased with industrialisation, which in Arabian countries is associated with significant increases in income due to large deposits of oil reserves, as well as the influence of rapid urbanisation and improved living conditions. Indeed, dietary changes, inactivity, socioeconomic, and demographic factors may all have a role in the increased prevalence of obesity in these populations (Abduelkarem et al., 2020).

Almost 41% to 56% of male and female participants aged 30 and older fall into the overweight category. Being overweight can limit everyday activities and increase stress, as well as contribute to poor sleep quality, both of which can encourage sedentary behaviour (Ong et al., 2017). Poor sleep quality was identified across all age groups in this study, with those aged 30 to 44 having the lowest quality. This is consistent with the findings of Gadie et al. (2017), which show that the profile of sleep quality changes throughout a lifetime; younger persons are more likely to experience problems as a result of poor sleep quality and longer sleep latency. Males were shown to be more physically active than females in this study. This adult observation has been documented both globally (Hallal et al., 2012, WHO, 2018) and locally (Mabry et al., 2016; Al-Hazzaa, 2018).

Females between the ages of 18 and 29 and males between the ages of 30 and 44 were the most active in terms of physical activity within age groups. 45-54 years old was the least active age group for both genders (61 percent for male and 49 percent for male). This is unsurprising given that physical activity levels are known to decline as people get older. Our data, however, suggest that the Arab population is more sedentary than the global norm. In Europe, the Western Pacific, Africa, and Southeast Asia, in adults aged 18 years and older levels of inactivity are substantially lower than in Arab countries (25%, 34%, 28%, and 17%, respectively compared to 51%) (de Moraes, et al., 2013; Sallis et al., 2016).

The data for this study was collected during the covid-19 pandemic, which has already resulted in a decrease in physical activity worldwide as a result of the covid-19 restrictions imposed (Aloitabi and Boukelia, 2021). Furthermore, as a result of the lockdown, most countries have closed indoor facilities, which are frequently the sole venue for physical activity in hot arid countries. Earlier research, pre-pandemic, however, reveals that there was considerable inactivity in this region, with pandemic limitations worsening the problem (Chaabane et al., 2020).

It appears that the sociocultural circumstances in many of the regions countries discourage physical activity (Sharara et al., 2018). Another element that has been considered is the expenditures connected with physical exercise participation. (El Masri et al., 2021). For example, a hot arid climate restricts outdoor physical activity and necessitates the use of special indoor facilities, which individuals frequently pay for. This may be a contributory factor to the lower levels of activity across all age groups when compared to global figures.

The first limitation, of this study is that it was conducted following covid-19 lockdown, which could have contributed to the region's low level of inactivity. As a result of the lockdown, most countries have closed indoor facilities, which are often the primary venue for physical exercise for these people. A second limitation is that most studies use questionnaires that are known to exaggerate activity levels, such as the IPAQ, to measure activity levels. There is a need for large-scale experimental studies that measure and track physical activity.

Overall, our study shows that individuals encountered moderate levels of stress. Moreover, there was no notable difference in felt stress levels among genders and across various health statuses. When comparing various age groups, individuals aged 30 to 44 exhibit higher levels of stress in comparison to other age groups. This conclusion corroborated a prior study (APS, 2023) that found that young adults had higher levels of stress compared to older individuals. The 2023 Stress in America study done by the American Psychological

Association (APA) reveals that individuals between the ages of 18 and 34 have an average stress level of 6 out of 10, while those aged 65 and older have an average stress level of 3.4 out of 10.

Discussion:

In conclusion, our findings show that in Arabic-speaking countries, development, urbanisation, and improved living conditions, combined with covid-19 restrictions, have resulted in increased consumption of unhealthy foods, which, when combined with decreased physical activity, has resulted in an increase in the prevalence of stress and sleep quality. Engaging in a physical activity could considerably improve the Arab population's healthy lifestyle. Indeed, initiatives to increase physical activity and prevent sedentary behaviour are required. To provide a complete picture, experimental investigations using monitoring devices to assess activity and biochemistry, as well as other lifestyle variables such as stress, are required.

Author contributions BA, AA and BI devised the conceptual idea and developed the methodology. AA, BA, AA and BI drafted the manuscript and analysed the data. All authors involved in data collection and approved the final manuscript.

Funding The authors gratefully acknowledge the funding provided for this research by Qassim University. The researcher(s) would like to thank the Deanship of Scientific Research, Qassim University for funding the publication of this project.

Data availability Datasets used and/or analysed are available upon request from the corresponding author.

Declarations

Conflict of interest The authors were wholly responsible for the research conducted in this paper and present the work without conflict of interest.

Ethical approval This study was approved by the Qassim University, Ethical approval number 07/22. The research was conducted in compliance with the 1964 Helsinki Declaration and its subsequent revisions, as well as related ethical standards.

Consent to participate Informed written consent was obtained from all participants in the study.

Consent for publication Not applicable.

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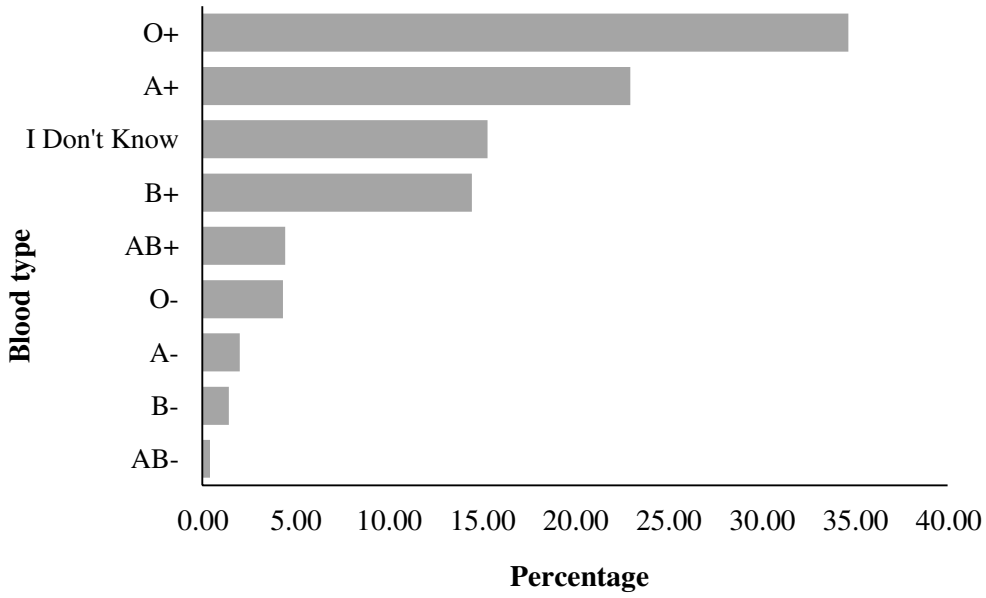


Figure 1: Distribution of the percentage of the blood type among the population.

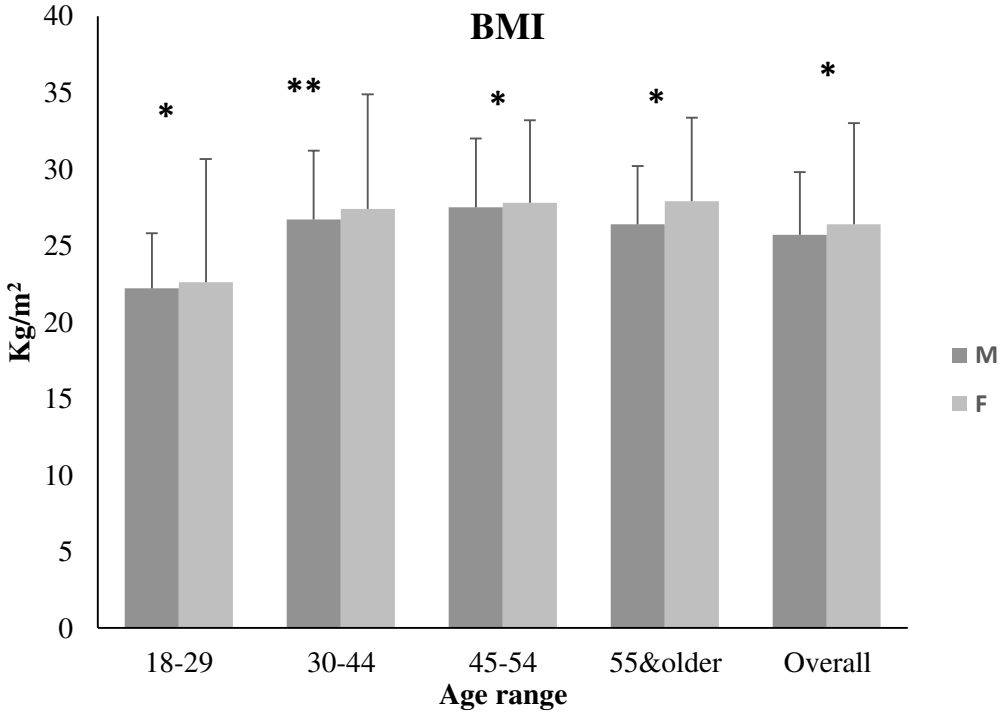


Figure 2: Comparison between BMI among the age group. * Denotes a significant difference between age group (P<0.05). ** Denotes a significant difference between gender (P<0.05), Values are mean ± SD.

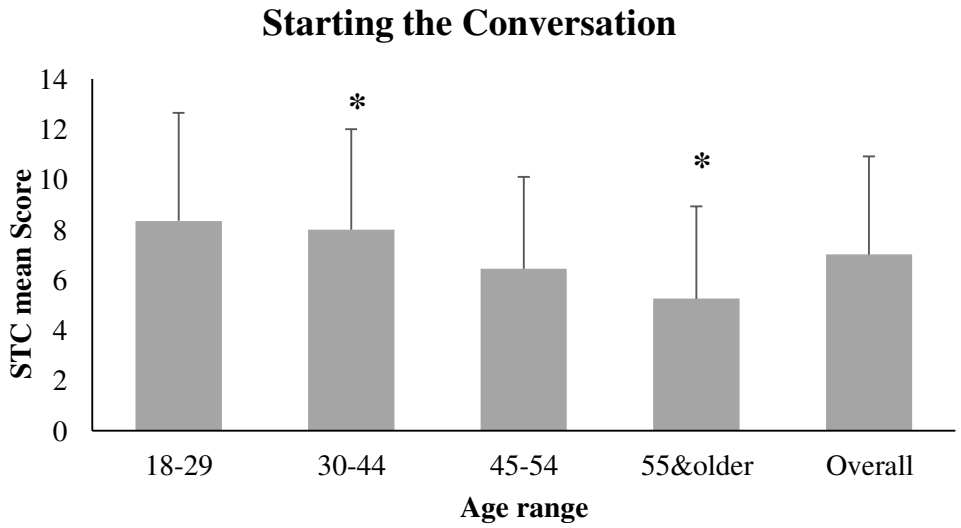


Figure 3: Comparison of the sum of the eight-item summary score across age groups. * Denotes a significant different between age group (P<0.05), Values are mean ± SD.

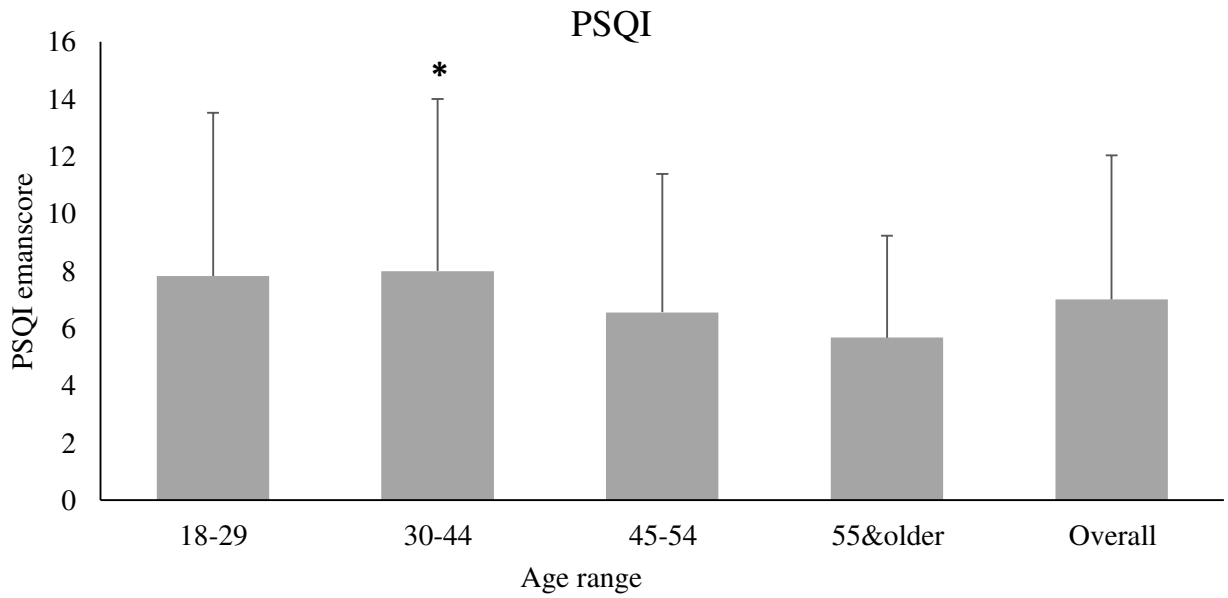


Figure 4: Comparison between the mean of the seventh components of the PQSI score among the age group ($P<0.05$), Values are mean ± SD.

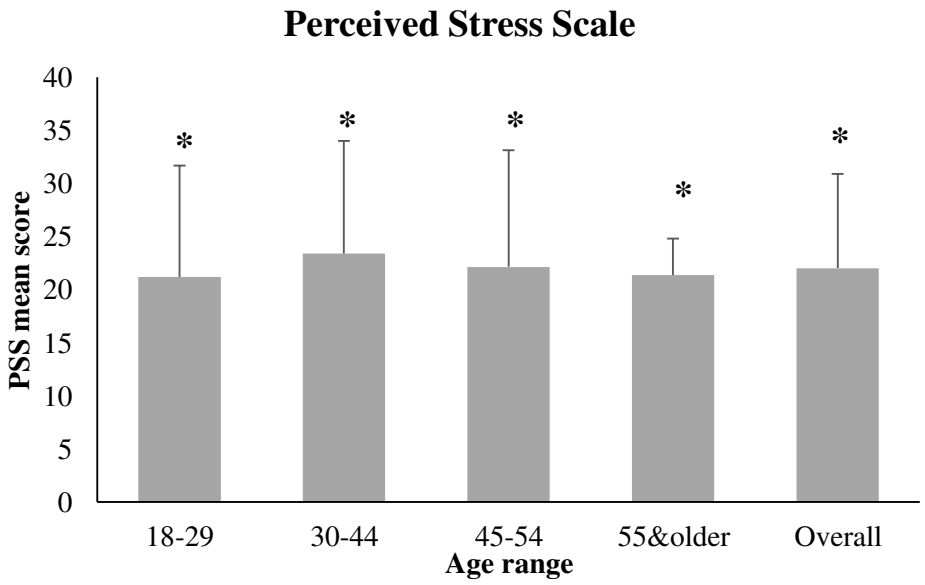


Figure 5: Mean score PSS 10 item inventory among the age group. * Denotes a significant different between age group ($P<0.05$), Values are mean ± SD.

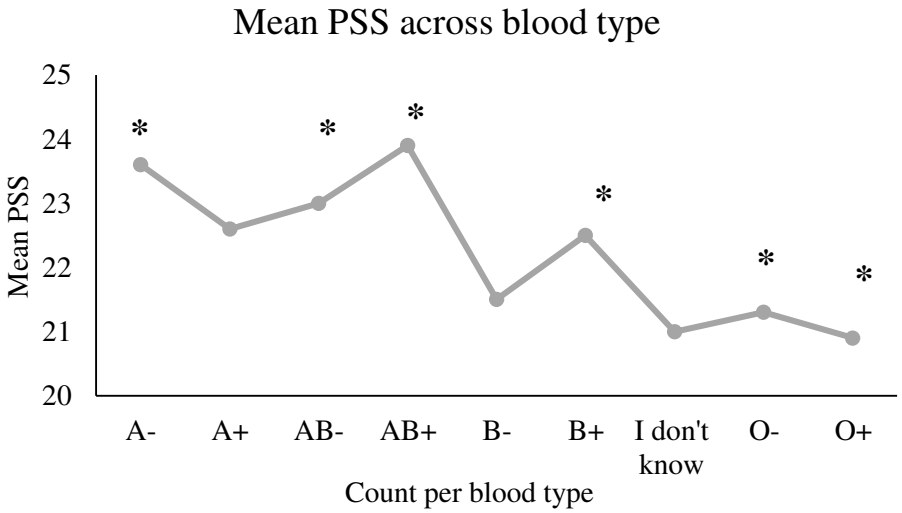


Figure 6: Mean score PSS across the blood type. * Denotes a significant difference between blood type and PSS ($P<0.05$), Values are mean.

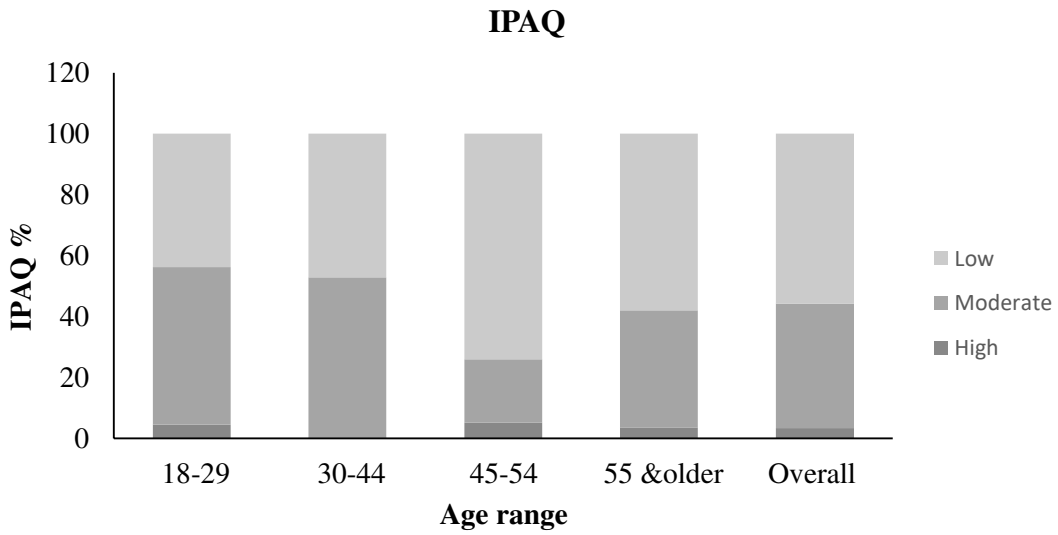


Figure 7: IPAQ score differences across age groups.

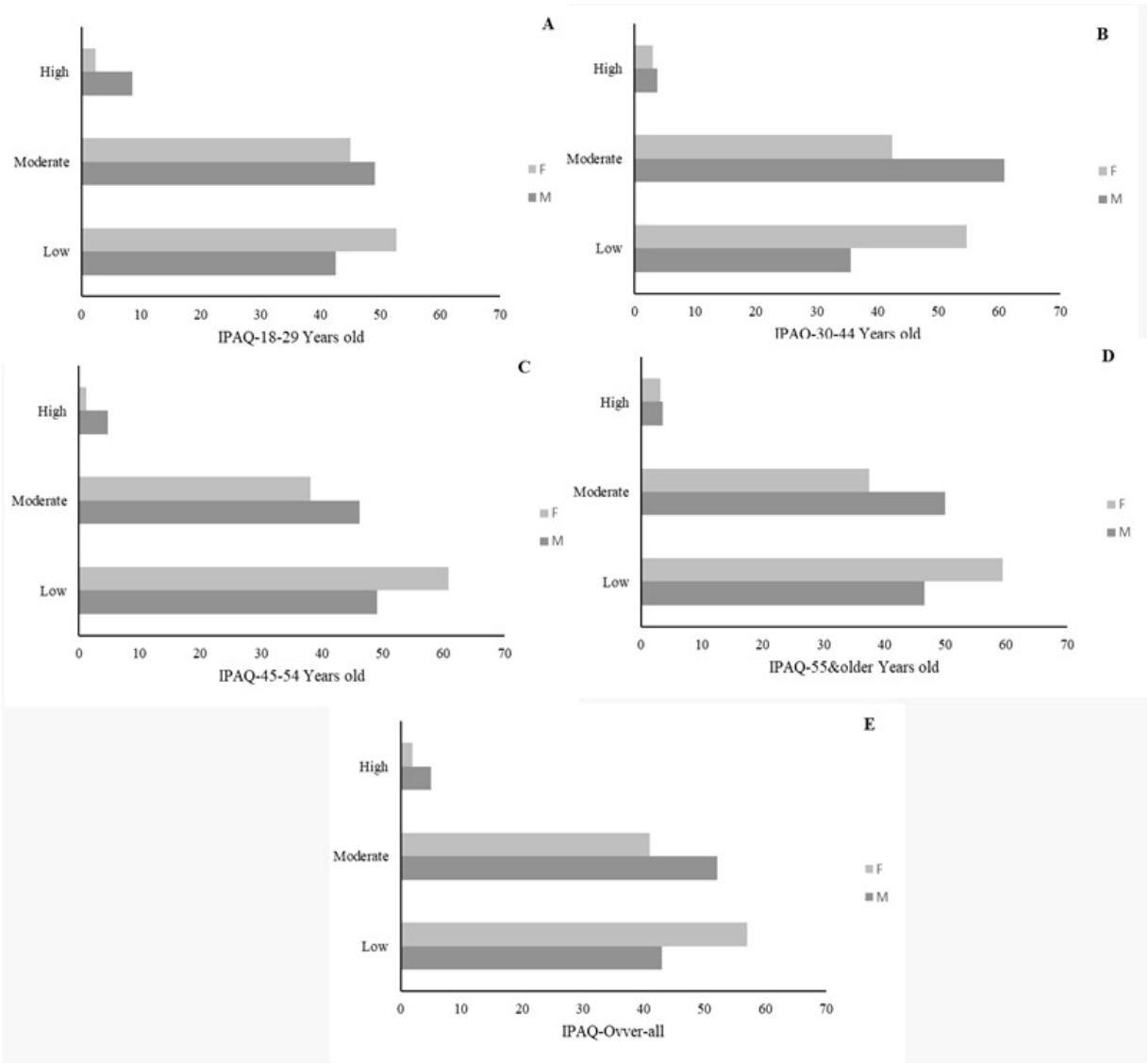


Figure 8: Age and gender differences in IPAQ scores.

1 Table 1: Gender and age range anthropometric measures.

Age range		**18-29**	**30-44**	**45-54**	**55&older**	**Overall**
Mass	M	67.1±12.4	82.4±13.9	83.2±14.9	80.1±14.7	77.9±13.9
	F	57.1±12.7	70.1±15.2	72.8±14.2	72.2±14	68±14
Stature	M	172.5±15.7	173.8±17.4	173±9.65	173.7±7.2	173.3±12.5
	F	159.1±8.6	160.1±15.4	161.8±5.9	161.2±2	161.5±7.9

2

Table 2: BMI categories based on age and gender.

Age range		18-29	30-44	45-54	55&older	By gender	Overall
Underweight	M	21%	1%	0.1%	1%	6%	8%
	F	28%	4%	3%	3%	10%	
Normal weight	M	60%	30%	20%	31%	35%	33.5%
	F	47%	33%	22%	25%	32%	
Overweight	M	16%	51%	56%	49%	43%	39.5%
	F	18%	41%	44%	41%	36%	
Class 1 obesity	M	3%	13%	20%	13%	12%	13.5%
	F	4%	14%	26%	17%	15%	
Class 2 obesity	M	0.3%	4%	4%	4%	3%	4%
	F	2%	5%	2%	12%	5%	
Class 3 obesity	M	0.2%	1%	0.8%	0.7%	1%	1.5%
	F	0.2%	3%	3%	2%	2%	

Table 3: Gender differences in STC across four age groups.

Age range	18-29	30-44	45-54	55&older	Overall
Male	8±3	7±4	6±3	5±3	6±3
Female	9±5	8±5	7±4	6±5	8±5
P-value	0.00*	0.00*	0.09	0.40	0.00*

* Denotes a significant different between age group (P<0.05), Values are mean ± SD.

Table 4: Change score in STC items and summary score, in the 4 different age groups. * Denotes a significant different between age group (P<0.05), Values are mean ± SD.

Food Item	Age18-29	Age 30-44	Age 45-54	Age 55&older	P-value
Fast food	0.94±0.60	0.72±0.61	0.51±0.58	0.39±0.57	0.002*
fruit	1.83±0.52	1.89±0.40	1.84±0.51	1.72±0.68	0.156
Vegetable	1.61±0.61	1.66±0.55	1.53±0.62	1.29±0.68	0.002*
Sodas	0.76±0.62	0.65±0.64	0.57±0.60	0.46±0.56	0.724
Beans	0.48±0.58	0.61±0.64	0.67±0.64	0.60±0.59	0.005*
Chips	0.66±0.71	0.37±0.58	0.23±0.51	0.21±0.44	0.009*
Desserts	0.76±0.71	0.57±0.68	0.47±0.66	0.36±0.58	0.615
Margarine	0.70±0.61	0.57±0.68	0.53±0.61	0.41±0.54	0.174
Total score	0.96±0.62	0.88±0.59	0.80±0.60	0.68±0.54	0.001*

Table 5: Gender differences in sleep quality across four age groups. * Denotes a significant different between age group (P<0.05), Values are mean ± SD.

Age range	**18-29**	**30-44**	**45-54**	**55&older**	**Overall**
Male	6±4	7±4	6±4	5±3	6±4
Female	9±6	9±7	8±6	7±5	8±6
P-value	0.00*	0.00*	0.00*	0.00*	0.00*

Table 6: Sleep quality in the 4 different age groups. * Denotes a significant different between age group (P<0.05), Values are mean ± SD.

Age range Components	18-29	30-44	45-54	55 &older	P-value
Subjective quality of sleep	0.92±0.80	1.02±0.80	0.82±0.71	0.76±0.59	0.229
Sleep latency	1.38±0.98	1.37±0.98	1.08±0.90	1.03±0.80	0.099
Sleep duration	0.99±1	1.24±0.99	1.24±0.94	1.14±1.15	0.318
Habitual sleep efficiency	0.85±1.15	0.81±1.58	0.68±1.05	0.85±1.24	0.456
Sleep disorders	0.90±0.57	0.90±0.56	0.80±0.55	0.70±0.62	0.024*
Use of sleep medications	0.25±0.65	0.21±0.63	0.27±0.72	0.28±0.67	0.862
Daytime dysfunction	1±0.72	0.97±0.65	0.82±0.68	0.77±0.60	0.283
Total score	6.32±3.32	6.52±3.59	5.73±3.21	5.63±3.58	0.196

Table 7: Gender differences in PSS across four age groups. * Denotes a significant different between age group (P<0.05), Values are mean ± SD.

Age range	**18-29**	**30-44**	**45-54**	**55&older**	**Overall**
Male	20±10	25±9	23±10	21±11	22±10
Female	23±11	22±12	20±12	19±11	21±11
P-value	0.00*	0.00*	0.02*	0.15	0.02*

Table 8: PSS percentages in various age groups (%).

Age range	18-29	30-44	45-54	55 &older	Overall score
Low stress	15.9%	8.2%	16.2%	23.4%	**15.9%**
Moderate stress	36.2%	28.6%	36.8%	37.2%	**34.7%**
High perceived stress	47.9%	63.2%	47.0%	39.4%	**49.4%**