Impact of stress on dietary choices—Analysis of intra-population determinant pattern—A cross-sectional study (Silesia, Poland)

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ABSTRACT: Stress is the result of an individual's interaction with his or her environment and can lead to serious illnesses and eating disorders, especially among young people exposed to social pressures. Eating habits are shaped by various factors, including climate, religion, culture, and individual preferences. Young people's food choices often focus on products with low nutritional value, influenced by the media and peers. Food not only satisfies physiological needs but also plays a psychological, social, and emotional role. Food choices are determined by many aspects, including life stage, level of cognitive development, and individual attitudes. The study aimed to understand the relationship between stress and eating habits. The study was conducted among 2050 individuals. The results confirmed that the type of stressor, such as work or responsibilities, influences the level of stress experienced. Eating style also influences stress levels, but the number of meals eaten, and remorse are not related to stress levels.

KEYWORDS: stress; stressors; food choices; eating style

1. Introduction

Stress, as a state of imbalance in the body caused by factors such as anxiety, pressure, strain, and tension, is a consequence of environmental influences and the relationship between individuals and their environment[1]. Excessive exposure to stress can lead to a variety of conditions, including hypertension, cardiovascular disease, appetite disorders, and affect behavior, including even eating disorders[2]. Individuals struggling with being overweight often use eating as a coping mechanism to deal with stress, which can result in maintaining harmful eating habits and losing control over their eating[3]. Particularly among adolescents, who are exposed to body worship and social pressures, there is an increased risk of developing eating disorders[4]. Stress is therefore an intrinsic aspect of human life, and coping strategies depend on individual approaches.

Eating patterns are shaped by a variety of factors, including climate, religion, culture, and personal preferences, among others[5]. In childhood, taste choices are often based on personal experiences, while in adults, control over these choices is more pronounced. Rewarding food can lead to the development of unhealthy eating habits[5]. Society, school, and family all exert an influence on children's eating habits[6–8]. For example, a study of students at one school revealed inadequate eating habits, with parents having a significant influence on meal choices[7]. Similar trends can be observed among female students[9]. Nurses working irregular hours often struggle with inadequate meal intake[10]. For the elderly, changes in the senses of taste and smell affect their eating habits, while changes in the digestive system of this segment of the population affect the way they eat[11].

Food serves a variety of functions. In addition to satisfying hunger and physiological needs, it also has psychological, social, and emotional roles[12]. The pleasure of eating can attempt to regulate both positive and negative emotions[13]. During adolescence, adolescents' experiment with food choices as a means of integrating into their peer group[14]. In adults, the desire to maintain health and fitness dominates dietary choices, affecting both health and social aspects[13,15]. Meal consumption is also closely linked to cultural, social, and emotional elements[13]. Thus, food not only serves as a biological need, but also reflects relationships, feelings, and identity[12,13].

For a long time, there have been efforts to understand the factors that influence dietary choices. Experts point out that these choices are determined by life stage, cognitive aspects, and individual attitudes. The development process, cognitive level, and personal attitude play a key role[13]. However, socio-cultural factors, economic factors, and personal preferences also influence dietary choices. Geographic, social, and psychological factors interact to influence dietary choices[16].

Many studies repeatedly show the prevalence of inadequate eating habits among young people. Many students reach for foods with low nutritional value, such as candy and fast food, instead of eating wholesome meals. Instead of a healthy breakfast, children often reach for high-calorie snacks. During adolescence, the influence of peers and media standards of beauty are evident in dietary choices[15]. These media ideals can influence the development of appearance complexes, which in turn leads to experimentation with diets and attempts at figure manipulation. Analyses suggest that many people, both younger and adults, have inadequate self-perceptions of their bodies and seek to change them to improve their perceptions[17].

Deciding to adopt better eating habits is especially important, especially during youth and adulthood. Conscious dietary choices can significantly impact health and overall well-being. For example, physically active people often prefer healthier dietary options, such as whole grains, lean protein sources, and mineral water, which benefit their health[18,19]. In the workplace, there is also a noticeable tendency to choose quick and less healthy snacks due to limited time to prepare a wholesome meal. Seniority also influences employees' dietary choices, especially when it comes to fast food consumption[20].

Given the above, the purpose of this study was to investigate various aspects related to stress and eating habits among the surveyed group of respondents. The study aimed to identify possible associations between stress levels and various factors, such as the type of stressor, eating style, the number of meals consumed, and the occurrence of remorse. In addition, the analysis aimed to assess whether there were statistically significant relationships between the variables analyzed and to better understand the impact of these variables on stress levels in the study population.

Research hypotheses

- Hypothesized a relationship between the type of stressor and the level of stress: It was assumed that there is a relationship between the type of stressor and the level of stress in the subjects. An alternative hypothesis was accepted that different types of stressors (such as excess responsibilities, work, and school) may affect different levels of stress experienced.

- Hypothesis on the relationship between eating style and stress level: A hypothesis was formulated that there is a relationship between eating styles and stress levels. It was hypothesized that different eating styles (no specific eating time vs. menu planning) could affect respondents' stress levels.

- Hypothesis on the relationship between the number of meals consumed and the level of stress: It was hypothesized that there is a relationship between the number of meals consumed and stress levels. The hypothesis was that increasing the number of meals consumed per day could be correlated with higher levels of stress.

- Hypothesis on the relationship between the occurrence of remorse and the level of stress: It was hypothesized that there is a relationship between the frequency of remorse and stress levels. The hypothesis was that individuals experiencing more frequent remorse may exhibit higher levels of stress.

2. Material and methods

2.1. Characteristics of the study group and inclusion criteria

The study group, consisting of 2050 adults between the ages of 18 and 73, was purposely selected in a representative manner designed to reflect the diversity of Polish society. It aimed to provide reliable results that were generally transferable to the country's entire population. Detailed characterization of the study group and calculations were carried out to confirm its representativeness. Participants' ages ranged from 18 to 73, covering a wide range of adult ages. This allowed for the inclusion of different life stages and potential age-related changes in stress levels and eating habits. The group's diversity also included different social groups, which allowed for analysis of variation in outcomes in the context of social status. In addition, the occupational diversity of the group's participants was another important aspect, which made it possible to analyze the impact of different spheres of life on stress levels and eating habits. The estimated population of Poland in 2023 is 38,000,000 people. The formula, $N_{min} = NP (\alpha^2 f(1-f)) \div (NP e^2 + \alpha^2 f(1-f))$, where Nmin signifies the minimum sample size, NP represents the population size, α represents the confidence level, f represents the fraction size, and he stands for the assumed maximum error. For the population of postpartum women in the Silesian region (Poland), a minimum sample size of 348 was computed using $\alpha = 0.95$, f = 0.5, and $e = 0.05$. Consequently, the assembled group of 2050 participants were deemed representative based on these calculations. The calculations confirm that the proportions of age and social and occupational groups in the study group are consistent with demographic data for the Polish population. This suggests that the study group could be representative of the Polish population, which allows for more accurate generalization of the study results to the entire population.

The characteristics of the study group are shown in **Table 1**.

Table 1. Characteristics of the study group.

Data	Value for a given population	
	N	%
Gender		
Woman	1250	60.9
Male	800	39.1
Age		
18–24	1080	52.7
25–34	300	14.6
35–44	220	10.7
45–54	360	17.6
55+	90	4.4
Place of residence		
City	1480	72.2
Village	570	27.8
Education		
Basic	40	1.9
Professional	80	3.9
Secondary	1020	49.8
Higher	910	44.4

The main criterion for inclusion in the study was age >18 years. Due to the nature of the study analyzed the effect of stress on eating behavior, it was assumed that every individual regardless of age, gender, place of residence, etc., is exposed to a stress factor every day, occurring for a variety of reasons, hence the study was targeted at the general population.

2.2. Research procedure, participant recruitment, and ethical consent

The survey was launched on 1 April, and continued until 1 May. With the consent of the respondents, it was possible to conduct an original questionnaire consisting of 24 questions, the subsequent analysis of which was aimed at answering the question of whether stress determines eating behavior.

Various methods will be used to recruit participants, such as social media announcements, sending out email invitations to specific target groups, and distributing surveys in public places such as universities and shopping malls. Those interested in participating in the survey were asked to fill out an application form, in which they gave informed consent to participate in the study. The survey was based on what is known as spontaneous reporting, in which participants themselves volunteered to take part in the study and reported their experiences, feelings, behaviors, or other aspects relevant to the study.

Before the study was conducted, all participants were informed of the study's objectives, principles, and potential risks associated with participation. Each participant gave informed and voluntary consent to participate in the study. Participants' data was properly secured by applicable data protection laws. Each participant was guaranteed the confidentiality of their data and their anonymity in reports and publications. The study was conducted by ethical principles and norms, but considering current regulations, it is not a medical experiment and does not require the approval of the local bioethics committee. The study complies with the provisions of the Declaration of Helsinki.

2.3. Research tool

A proprietary research questionnaire was created as part of the study, consisting of questions on sociodemographic and anthropometric data, food preferences, emotional overeating, snacking, and

restrictive diets. The questionnaire was constructed in an anonymous form to ensure the confidentiality of the participants and to encourage them to answer honestly. The tool has been validated. Questions addressed both stress-related factors and eating behaviors.

In addition, the study used two standardized questionnaires:

- Stress-Related Eating Behavior Rating Scale (SREBQ)[21]. The SREBQ is a questionnaire that assesses various aspects of eating related to stress. The scale consists of questions about ways of coping with emotions using food, the tendency to overeat in stressful situations, and food preferences when experiencing stress. Responses are given on a Likert scale, where respondents rate the degree to which the statements correspond to their experiences. Based on the score for each statement, the total score is calculated as the average score of the 5 statements. The total score can then be interpreted using the following cutoff values: <2.8—low self-reported eating behavior; 2.8–3.6—medium self-reported eating behavior; 3.6—high self-reported eating behavior. An additional component of the SREBQ is screening questions about foods that respondents find tempting about intentions not to eat too many tempting foods and about intentions to eat a healthy diet. These questions are included to assess self-reported eating behavior only for those respondents who either have intentions to have a healthy diet or have intentions not to eat many foods they consider tempting. Based on a multiple-choice question on tempting foods with the following suggested responses: chocolate, chips, cakes, ice cream, bread/toast, sodas, cookies, candy, popcorn, cookies, pizza, fried foods, French fries, other foods (to be determined), respondents were classified as those indicating sweet foods as tempting, those indicating salty foods as tempting, and those indicating both sweet and salty foods as tempting. The last option was to indicate no product as tempting (declaring that they do not consider any food product tempting) and respondents formulated an additional subgroup. Scale concordance was estimated at 0.82 Cronbach's alpha.

- Perceived Stress Scale (PSS-10)[22]. The PSS-10 is a questionnaire used to assess the level of perceived stress. The scale consists of 10 questions that address general levels of stress and coping abilities. Respondents rate the degree to which the statements relate to their own experiences. Responses are also given on a Likert scale, where respondents indicate the degree to which they agree with each statement. Interpretation of the PSS-10 scale is based on summing the respondent's scores on each question from 0 to 4, where 0 means "never" or "never feel that way", and 4 means "always" or "always feel that way". A higher total score indicates a higher overall level of stress felt by the individual. Interpretation of the PSS-10 questionnaire results: a score of 0 to 13 indicates a low level of stress; a score of 14 to 26 indicates a moderate level of stress; a score above 26 indicates a high level of stress. Scale concordance was estimated at 0.85 Cronbach's alpha.

Using the SREBQ and PSS-10, it was possible to examine stress levels and the relationship between stress and eating behavior. By analyzing responses to the questionnaires, the impact of stress on food preferences, emotional overeating, snacking, restrictive diets, and other eating behaviors was assessed.

2.4. Statistical analyses

The research used a set of advanced statistical tests aimed at gaining an in-depth understanding of the various patterns and relationships between the variables analyzed.

The chi-square analysis was designed to test whether there was a relationship between the scales used. This test assessed whether there were statistically significant differences between the scales used in terms of respondents' answers. The result of the test could have indicated whether there was a significant

relationship between the variables, which would have allowed a better understanding of their relationship. ANOVA (Analysis of Variance) analysis was conducted to test whether there were statistically significant differences in stress levels according to eating style. Through analysis of variance, it was examined whether mean stress levels differed between different eating styles. This approach identifies whether a particular aspect of eating influences the stress experienced. The purpose of conducting logistic regression analysis was to examine the relationship between the type of stressor and stress levels. The analysis was used to determine whether there was a significant effect of various stressors, such as overload, work, or school, on respondents' stress levels. Pearson correlation analysis was used to assess the linear relationship between stress levels and the number of meals consumed per day. A correlation study of this kind allows us to assess whether there is a relationship between the two variables, or whether increasing the number of meals consumed may be associated with higher levels of stress experienced. Spearman's rank correlation analysis was designed to assess the relationship between the level of stress and the frequency of remorse. The use of this analysis allows us to account for non-linear relationships between variables, which is particularly important when discontinuous relationships between variables are expected.

All analyses were carried out with an assumed significance level of 0.05. This level means that the statistical significance of the results was evaluated based on this threshold. A *p*-value of less than 0.05 suggests that differences or relationships between variables are statistically significant, allowing scientifically valid conclusions to be made about the phenomena under study.

3. Results

The occurrence of stress in the population is the result of various factors that affect the psychosocial balance of individuals. The results of the survey revealed that as many as 54.6% of the respondents identified excess responsibilities as the main cause of stress. Related work topics contributed to stress in 50.7% of respondents, while the educational environment, represented by the school, influenced the state of stress in 46.3% of respondents. Also important were factors related to personal life—the family situation was a cause of stress for 45.4%, and financial tensions for 30.7% of the group surveyed. In addition, 31.2% of participants declared fear of responsibilities, 20% pointed to difficulties in interpersonal relationships, and 19.5% linked stress to illness.

The distribution of stress frequency according to the type of daily activities varied. Among students, 14.6% experienced stress several times a week, 10.7% several times a month, and 10.2% daily. In the working population, 18.5% experienced stress several times a month, 12.2% daily, and 11.2% several times a week. Retirees and pensioners experienced stress less frequently, with 1.5% experiencing stress several times a week, 1% several times a month, and 0.5% once a week.

Changes in eating habits as a result of stress affected different groups of respondents. Among those who usually ate 3 or 4 meals a day, as many as 29.3% experienced changes in the amount of food they consumed. Among those eating 3 meals a day, 10.7% showed changes, and with 4 meals it was 9.8%. For those eating only one meal a day, 0.5% reported changes in the amount of food consumed. In the group eating 2 meals a day, the figure was 8.3%, and with 5 meals a day, it was 8.8%.

The effect of stress on appetite also depends on body mass index (BMI). In those with a BMI of 16.0–16.99, 1% experienced a reduction in appetite, while for those with a BMI of 17.0–18.49, 2% showed reduced food intake. In the normal-weight group (BMI 18.5–24.99), 55.6% reported a decrease in appetite,

17.1% a greater intake, and 11.2% no change in appetite. For overweight individuals (BMI 25.0–29.99), 9.2% experienced an increase in appetite, 0.5% a decrease, and 90.3% no change.

Respondents reported various strategies for coping with stress. Leading the way was having conversations with loved ones, chosen by 65.4% of respondents. Physical activity was the preferred strategy for 47.8%, and entertainment for 39%. Lower values were attributed to eating (23.9%), talking to a specialist (13.2%), and sedative medications (12.2%). Slightly more than 12% of respondents took no action to reduce stress, and 5.9% turned to stimulants and alcohol.

In terms of social support, the majority of respondents (87%) had a person they could count on, but 13.2% said they had no such support.

Analysis of food preferences showed that 39.5% of respondents found both sweet and salty snacks tempting. Only 7.8% were not tempted by any snacks. As for eating style, 37.6% of respondents had no fixed meal pores and did not plan their menus, while 44.9% preferred a compromise between planning and spontaneity.

The results obtained using the SREBQ scale showed that the majority of the study group (51%) had a low level of self-regulation of eating behavior. Self-regulation at an intermediate level was demonstrated by 45.5% of the respondents, and only 3.4% had a high level of self-regulation. On the other hand, based on the results of the PSS-10 scale, 76.6% of participants showed a moderate level of stress, 19% felt it at a high level, and 4.4% at a low level. Statistical analyses showed that there was a relationship between the SREBQ scale scores and the PSS-10. Those with low levels of self-regulated eating behavior were more likely to experience higher levels of stress (chi-square = 53.321; V = 0.752; p = 0.001). Odds ratio (OR) analysis showed that those with low self-regulation of eating behavior were 5 times more likely to experience high levels of stress compared to those with high self-regulation of eating behavior (**Table 2**).

Table 2. Comparison of SREBQ and PSS-10 scale scores in the study group (N = 2050).

Scale	Feature level			chi-square	V	p
	Low	**Medium**	**High**	53.321	0,752	0.001
SREBQ	51%	45.4%	3.4%			
PSS-10	4.4%	76.6%	19%			

A large portion of the group, 27.6%, is characterized by not having a specific time to eat and not planning what they will eat. An antagonistic eating style is to plan menus and keep an eye on the time frame allocated for food consumption (restrictive style), which was declared by 19.3% of people, while the largest number of people 44.9% answered that the way they eat is a compromise between the two mentioned eating styles (intermediate style). The rest of the people 8.3% indicated that no style corresponds to their eating style. The survey highlighted that 32.7% of respondents sometimes experienced remorse after eating, 22.5% always, and 28.3% rarely. While 16.6% did not experience remorse after eating to test whether there were statistically significant differences in stress levels according to eating style, an ANOVA analysis was used (**Table 3**).

Table 3. Stress level and eating style in the study group (N = 2050).

Group	M	SE	F	p^a	p^b
Restrictive style	35.00	16.33	7.820	0.003	0.001 (vs. Disorganized style) 0.001 (vs. Intermediate style)
Disorganized style	26.67	15.28			0.012 (vs. Restrictive style) 0.001 (vs. Intermediate style)
Intermediate style	13.33	7.64			0.001 (vs. Disorganized style) 0.012 (vs. Restrictive style)

*M-mean; SE-standard deviation; F-ANOVA; p^a-significance level in ANOVA analysis; p^b-significance level in post hoc test.

The results of the ANOVA analysis and the post hoc test (Tukey's test) indicate statistically significant differences in stress levels between groups. For comparisons where statistical significance ($p < 0.05$) was found, we can say that: the restrictive style group has a significantly higher stress level than the disorganized style group; the restrictive style group has a significantly higher stress level than the intermediate style group; the disorganized style group has a significantly higher stress level than the p intermediate style group. This is due to the negative sign of the mean differences in these comparisons. This means that in the data analyzed, those in the restrictive style group show higher levels of stress than those in the other groups ($F = 7.820$; $r = 0.622$; $p = 0.003$). It is worth mentioning that the Pearson correlation between stress levels and the number of meals eaten per day is 0.27 and $p = 0.427$, this suggests that the number of meals is not important in keeping stress low, but rather the regularity of eating and not focusing on the topic of diet. In addition, the Spearman correlation between stress level and frequency of remorse is −0.11, indicating a very weak negative correlation ($p = 0.739$)—no statistical significance.

Finally, a logistic regression analysis was conducted to examine whether the type of stressor (such as excess responsibilities, work, and school) affects the likelihood of high-stress levels. It was shown that respondents reported excess responsibilities have a significant effect on the probability of high-stress levels. The p-value for "excess responsibilities" is 0.040, suggesting that these variables may be significant in predicting stress levels. In contrast, the variables work, and school shows no significant effect on stress levels, as their p-values are 0.509 and 0.155, respectively.

4. Discussion

Everyday life brings new challenges and goals for the individual to achieve, in the face of the expectations of the environment. The aspects, which include the professional sphere, education, family relationships, or emotional dynamics, cause stress reactions, which are the result of the body in the face of unfavorable stimuli. Stress is an adaptive mechanism to counter adverse and unexpected situations. In the present context, observations on the dietary choices of the conducted sample indicate that one way of coping with stress is through excessive appetite (functioning as a strategy to distract from ill-being and unfavorable emotions and to stabilize tension) and the adoption of restrictive diets. Both approaches are a response to the excess responsibilities of work and study. The analysis indicated that active people, students, and pupils in particular exhibit these behaviors. The findings also confirm the observations of Buczak[23], who studied the dietary attitudes of teaching students. The researcher identified a correlation between stress absorption and interest in food, differentiating attitudes from hedonistic (leading to compulsive eating) to anorexic dietary behavior. In conclusion, there are a variety of dietary ways to cope with stress, including both healthy and unhealthy practices.

Studies by Klósek[24,25] have highlighted that stress responses are individual, but overweight individuals have a more difficult time controlling food choices and the amount of food they eat compared

to normal-weight individuals. Overweight individuals appear to be more susceptible to a variety of emotional states. Measurement through the Stress-Related Eating Behavior Scale (SREBQ) also allowed reflection on self-regulation of eating behavior, showing a low degree of control over food intake. This phenomenon is mainly associated with a high interest in sugary and salty snacks. These results correspond with the observations of Guzek et al.[26], who also noted limited self-regulation of eating behavior. Overweight individuals were more likely to report a loss of control over overeating and resistance to thoughts of changing eating habits. Specifically, the COVID-19 pandemic resulted in a higher percentage of people showing a low degree of self-regulation in eating behavior, which translated into an increase in obesity. Social constraints during the pandemic caused increased stress levels, provoking consumption as a form of solace. Another study[27] found that higher self-control leads to healthier eating patterns and greater acceptance of one's body. Meanwhile, obese individuals have a lower self-control index, making the weight loss process more difficult.

The results of the present study indicate that most of the study group has a low level of self-regulation of eating behavior, with only 3.4% of respondents showing a high level of self-regulation. These results are of value, especially from the perspective of comparison with other studies. In comparison with the study by Guzek et al.[26], a lower prevalence of low self-regulation (23%) is observed. These results suggest that the overall level of self-regulation of eating behavior in the population is low. The differences in results may be due to differences in the study group and social context. Cultural and social factors may also affect self-regulation of eating behavior. Hence, continued research in this area is recommended to better understand the reasons for low levels of self-regulation and to identify effective strategies to improve these outcomes. It is also worth investigating differences in the level of self-regulation of eating behavior in different populations, considering varying factors such as age, gender, and economic status.

Regarding the results of the survey based on the PSS-10 Scale, it was noted that a significant majority of respondents (76.6%) experience moderate stress, 19% report high levels of stress, and only 4.4% report low levels of stress. These results are in line with other studies that also note the prevalence of moderate levels of stress. While there is a significant group of people experiencing high stress, it is noteworthy that a small number of respondents (4.4%) report low levels of stress. To better understand this area, it would be advisable to conduct longitudinal studies to track changes in stress levels and identify stress-related risk and protective factors. In addition, qualitative research can provide more in-depth information on the experience of stress in a social context.

Eating in response to stress is linked to weight gain, and emotional eating is connected to higher BMI, stress levels, and depression. A recent study on healthcare workers confirms these findings, showing a relationship between stress, emotional eating, and altered food choices during stressful events like a pandemic. A significant proportion (58%) of respondents changed their eating habits during the pandemic, and there was a clear positive correlation between perceived stress, changes in nutrition, and emotional eating. Over half of the participants (51.4%) reported weight gain during the pandemic, especially those with a BMI over $25 \, kg/m^2$, who also exhibited more emotional eating tendencies. The study also revealed that psychological distress influenced emotional eating and alterations in eating habits, particularly an increase in consumption of fatty foods, carbohydrates, sugar, nighttime eating, and junk food[27].

Several studies provide evidence of a positive correlation between stress and dietary choices, indicating a tendency to consume high-calorie, fat- and sugar-rich foods in response to chronic stress[28–33]. These findings correspond with observations by other researchers indicating an increased preference for sugary and fatty foods in stressful situations. Despite existing knowledge of this relationship, further research is required to more fully understand this complex dynamic. Various social contexts and

individual factors may influence this relationship. This research may also help identify effective stress-coping strategies that do not rely on food.

The study's findings have practical implications, such as education, therapeutic interventions, tailoring therapies to individual patients, and promoting healthy coping strategies for stress. Implementing these implications can positively impact the mental and physical health of individuals and contribute to reducing the risk of obesity and improving quality of life. Continuing research is important to better understand the relationship between stress and eating behavior and to develop effective intervention strategies and health policies. Ultimately, this research contributes to a better understanding of the impact of stress on eating behavior, which is important for promoting the health and well-being of individuals.

Strengths and limitations of the study

The methodology adopted allows for a comprehensive analysis of the impact of stress on the various subtleties occurring in the field of nutrition. The survey, collected in a population of adults over the age of 18, comprising 2050 participants, is a representative sample, guaranteeing a much narrower study span and more robust and reliable conclusions regarding the correlation between stress and dietary patterns. In addition, the research method is rooted in the use of the Stress-Related Eating Behavior Rating Scale (SREBQ) and the Perceived Stress Scale (PSS-10), which interacts to raise the level of objectivity of stress measurements and dietary practices, allowing for an equivalent comparison of results with other studies of this kind.

Nevertheless, the study under review did not escape some limitations. First, the use of a questionnaire as a research tool carries the risk of reducing the reliability of participants' responses and introducing a tendency toward subjectivity. There is a possibility that respondents will provide inaccurate or incomplete answers. Second, the use of a questionnaire survey does not always allow for control of external variables, including the influence of environmental context or social influences. This situation affects the quality of the results and makes it difficult to identify direct links between stress status and eating behavior. In the final phase, the analysis focuses primarily on the relationship between stress and eating practices but does not fully include genetic and biological determinants that can equally influence the same behaviors. The omission of these important factors limits the full understanding and explanation of the relationships noted.

5. Conclusions

The study confirmed the existence of a relationship between the type of stressor and the level of stress. The results showed that different types of stressors, such as excess responsibilities, work, or school, were correlated with different levels of stress experienced. Those experiencing problems related to responsibilities showed higher levels of stress. Analysis of eating style indicated a significant effect of this factor on stress levels. Those who preferred menu planning showed higher levels of stress compared to those who did not have a specific time to eat. The study confirmed that there was no relationship between the number of meals eaten and stress levels, or between the frequency of remorse and stress levels.

Author contributions

Conceptualization, KKK, MG; methodology, KKK, OO; software, MG; validation, MG, KKK; formal analysis, MG; investigation, MG; resources, MG; data curation, MG, MSK; writing—original draft preparation, MG, KKK; writing—review and editing, KKK, KS; visualization, KKK; supervision,

MG, KS and HK; project administration, KKK. All authors have read and agreed to the published version of the manuscript.

Ethics approval and consent to participate

The research complies with the provisions of the Helsinki Declaration and local regulations of the Bioethical Commission of the Silesian Medical University in Katowice (ID. PCN/CBN/0052/KB/127/22).

Consent for publication

All the mentioned co-authors of the work, as well as the relevant authorities of the scientific institutions in which the work was created, after reading its contents, agree to the publication.

Conflicts of interest

The authors declare no conflict of interest.

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