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Changes in Body Composition Among Young Adults from Bydgoszcz (Poland) in 2021–2025: A Report on Secular Trends

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Abstract

Objective: The aim of the study was to assess changes in somatic types according to the Wanke–Kolasa classification among physiotherapy students between 2021 and 2025 and to analyze the influence of selected socio-urbanization factors on the somatic structure of the studied population.
Materials and Methods: The study included 574 first-year physiotherapy students from Bydgoszcz, including 207 men and 367 women. Based on anthropometric measurements, five typological indices constituting the basis of the Wanke–Kolasa somatic classification were calculated. Selected socio-urbanization factors were also analyzed. Descriptive statistics, the Mann–Whitney U test with Bonferroni correction, and the Jonckheere–Terpstra test were applied.
Results: The studied population was dominated by components corresponding to a slender and relatively athletic body build. Both women and men demonstrated slight fluctuations in individual somatic components; however, no significant monotonic trends over time were observed. Mixed somatic types occurred more frequently than homogeneous profiles. Socio-urbanization factors showed no significant influence on somatic structure, except for a local association between maternal education level and the "H" component among women.
Conclusions: The somatic structure of physiotherapy students during the analyzed period demonstrated high stability. The obtained results indicate limited variability of morphological traits in young adults after the completion of biological maturation and suggest a greater role of biological factors and lifestyle than classical socioeconomic determinants in shaping somatotype.

Keywords
Somatotype, anthropometry, Wanke–Kolasa typology, physiotherapy students, biological anthropology

1. Introduction

In recent decades, distinct morphological transformations have been observed among populations of young adults, associated with processes of urbanization, lifestyle changes, modifications in dietary patterns, and reductions in everyday physical activity [1–4]. These phenomena are part of the global trend referred to as secular trends, encompassing dynamic intergenerational changes in body height, body mass, somatic proportions, and body composition [1,5]. The literature emphasizes that contemporary biological transformations in young populations increasingly follow a direction unfavorable to health, leading to a higher prevalence of excessive body mass, reduced physical performance, and deterioration of functional body parameters [2,3,6].
This issue is of particular importance among students of medical and health sciences, especially physiotherapy students, from whom future professional practice requires not only high clinical competence but also an appropriate level of physical fitness and proper somatic structure [7,8]. Nevertheless, recent studies increasingly indicate that unfavorable changes concerning physical activity levels, body composition, and endurance parameters are also observed within this group [4,9]. Research conducted among academic populations in various countries suggests that the university period represents a particularly vulnerable stage for the development of sedentary behaviors and deterioration of somatic health quality [10,11].
Typological assessment of body structure according to the Wanke–Kolasa concept remains one of the most valuable achievements of Polish biological anthropology, enabling multidimensional analysis of body proportions and assessment of the contribution of

individual somatic components to body structure [12,13]. This typology, based on relationships between longitudinal, breadth, and mass-height characteristics, allows identification of dominant body structure elements (I, A, V/Y, and H) and facilitates the tracking of intergenerational and environmental transformations [12]. Unlike classical somatotype methods, such as the Heath–Carter concept, the Wanke–Kolasa method enables more precise assessment of morphological proportion changes characteristic of Central and Eastern European populations [14]

Contemporary international studies indicate that environmental and civilizational changes affect not only body mass and height parameters but also body proportions and somatic structure among young adults [5,15]. Particular importance is attributed to urbanization factors, socioeconomic status, and changes in physical activity patterns [3,15,16]. Additionally, the COVID-19 pandemic led to substantial reductions in spontaneous physical activity, increased sedentary behavior, and deterioration of health-related parameters among student populations [6,17]. Consequently, long-term studies of somatic changes among young adults associated with health sciences are becoming increasingly important.

Previous studies conducted among physiotherapy students from Bydgoszcz demonstrated long-term changes in physical fitness components between 2001 and 2020, indicating gradual deterioration of selected motor parameters important from both health and occupational perspectives [8,18]. Subsequent analyses also revealed persistence of unfavorable trends in body proportions among both residents of highly urbanized areas and individuals originating from rural regions [19]. A reduction in the number of men in the studied populations and a decreasing proportion of residents from large cities, accompanied by an increasing proportion of individuals from rural areas, were also observed [20].

Analysis of somatic compositions demonstrated dominance of V and I elements among men and I and Y elements among women, with the lowest contribution of the H element [20]. The pattern of changes was not linear but rather resembled a sinusoidal distribution. In all analyzed years, mixed types V-Y/I and I/V-Y predominated, accompanied by relatively frequent occurrence of pure types with dominance of the I component. No significant changes in somatic compositions were observed among men, whereas among women a decrease in the contribution of the A element and an increase in the contribution of the Y element were noted [20]. Extension of analyses to include place of residence size and parental education level did not alter the observed direction of changes [20].

Despite the growing number of studies concerning secular morphological changes among young adults, analyses focusing on physiotherapy students using the classical Wanke–Kolasa typology remain limited, particularly in the post-COVID-19 period. Furthermore, there is a lack of studies evaluating contemporary directions of somatic transformations among medical students in the context of social and environmental changes occurring in Poland after 2020.

Therefore, the aim of the present study was to assess changes in somatic types according to the Wanke–Kolasa classification among physiotherapy students from Bydgoszcz between 2021 and 2025, taking into account sex differences and directions of transformations in the somatic structure of contemporary academic youth.

2. Materials and Methods

Between 2021 and 2025, the study included young adults studying physiotherapy in Bydgoszcz (Poland) at the Ludwik Rydygier Collegium Medicum, Nicolaus Copernicus University in Toruń. The analysis comprised all first-year physiotherapy students, yielding complete datasets from 207 male and 367 female students, representing approximately 95% of the target population.

The Wanke–Kolasa typology was selected for the analysis of body structure changes due to its broad applicability, objectivity, and clear taxonomic procedure. The method is based on the calculation of five indices: trunk length index (percentage ratio of trunk length to body height), shoulder-to-trunk index (percentage ratio of shoulder breadth to trunk length), chest index (percentage ratio of chest depth to chest breadth), hip-to-shoulder index (percentage ratio of hip breadth to shoulder breadth), and the Rohrer index (ratio of body mass in grams to the cube of body height in centimeters). Based on these indices, four body structure types were distinguished and designated by letters according to similarities in body silhouette: I, A, V/Y, and H. Separate numerical characteristics for men and women, referred to as reference points, were provided for each type by the authors of the classification [12,13]. The use of this method enabled monitoring of body structure changes within the analyzed student groups.

Research Procedures: At the end of each academic year included in the study, the following measurements were obtained: body height (B-v), body mass, trunk length (sst-sy), shoulder breadth (a-a), chest breadth (thl-thl), hip breadth (ic-ic), and chest depth (xi-ths) according to Martin–Saller anthropometric methodology. Measurements were performed using a Swiss-made GPM anthropometer and large spreading caliper with an accuracy of 1 mm, as well as a DB-1H Castex electronic scale with an accuracy of 0.01 kg for body mass assessment. The obtained measurements enabled calculation of the above-mentioned anthropometric indices [Božilov]. A questionnaire survey was additionally used to determine participants' age and the prevalence of socio-urbanization factors according to study year, including region and size of place of residence, type of completed secondary school, parental education level, and the presence of a physical fitness examination during the university admission process.

Research Ethics: Data collection was conducted during the final stage of anthropometry classes (17 hours), which enabled retrospective analysis. Approval for the study was granted by the Research Ethics Committee of the Faculty of Health Sciences at Nicolaus Copernicus University in Toruń (No. KEBN WNoZ 55/2025). All participants were informed about the purpose of the study, the nature and duration of the measurements, and their right to withdraw from participation at any stage without providing a reason. All procedures contributing to this work complied with the ethical standards of the relevant national and institutional committees on human experimentation and with the Declaration of Helsinki of 1975, revised in 2008.

Statistical Analysis: wThe calculated indices were presented using basic descriptive statistics, including arithmetic means, standard deviations, and medians. Changes in somatic compositions were assessed using the Mann–Whitney U test with Bonferroni correction and the Jonckheere–Terpstra test.

Statistical analyses were performed using Python programming language version 3.14.2 with the following libraries: pandas (v. 2.3.3), numpy (v. 2.4.1), scipy (v. 1.17.0), matplotlib (v. 3.10.8), and statsmodels (v. 0.14.6). The Jonckheere–Terpstra test was conducted using R version 4.5.2 with the clinfun package (v. 1.1.5).

All analyses were performed assuming a significance level of $p < 0.05$.

3. Results

Tables 1 and 2 present the values of body structure indices for men and women, respectively. Men examined in 2023 demonstrated the highest chest index values. In terms of the remaining indices, their body structure remained relatively stable over time.

Women examined in 2021 demonstrated distinctly higher chest index values, while the shoulder breadth index fluctuated between 2022 and 2025. The remaining indices remained relatively stable throughout the observation period.

(Tables 1 and 2)

Tables 3 and 4 present the percentage characteristics of somatic compositions and their corresponding formulas. Among men, a marked predominance of the "V" and "I" components was observed, whereas the remaining components occurred at relatively similar frequencies. Among women, the “I” and “Y” components clearly predominated, while the remaining elements were relatively similar, with the lowest contribution represented by the “H” component. It is difficult to identify a distinct trend for individual components in either sex because all elements changed in a non-monotonic manner over time.

(Tables 3 and 4)

Table 5 presents year-to-year changes in somatic compositions among men. In 2025, a significant increase in the percentage contribution of the “V” component was observed. This finding is also illustrated in Figure 1, which demonstrates that the increase reached nearly 25% compared with the previous year.

(Table 5 and Figure 1)

Table 6 and Figure 2 present year-to-year changes in somatic compositions among women. The observed differences were not statistically significant, and the changes in female somatic composition, similarly to those observed among men, did not demonstrate a monotonic trend.

(Table 6 and Figure 2)

Table 7 presents the percentage contribution of somatic components among men, including mixed types, whereas Table 8 contains the formulas of mixed somatotypes. The dominant mixed types were “I/V”, “V/I”, and “V”. Their distribution generally followed the order “V/I” > “I/V” > “V”, except in 2021, when the “I/V” component predominated.

(Tables 7 and 8)

Table 9 presents the percentage contribution of somatic components among women, including mixed types, whereas Table 10 contains the formulas of mixed somatotypes. Similarly to men, the dominant mixed types were “I/Y” and “Y/I”. During the observation period, the “Y/I” component demonstrated a marked increase, accompanied by a slight monotonic decrease in the “I/Y” component.

(Tables 9 and 10)

Table 11 presents the assessment of changes in somatic compositions among men and women according to study year using the Jonckheere–Terpstra test with alternatives assuming monotonic trends. The analysis demonstrated no evidence supporting the presence of monotonic trends for any somatic composition component in either men or women.

(Table 11)

Table 12 presents the coefficients of the linear model describing relationships between percentage somatic composition and measurement time, place of residence size, and parental education level. Most regression coefficients were statistically non-significant, indicating a lack of influence of the analyzed factors on changes in somatic compositions among the studied participants. Apart from the intercept terms, the only significant variable was maternal education level for the “H” component among women. This finding indicates that vocational maternal education was associated with an approximately 3% lower contribution of the “H” component compared with female students whose mothers had higher education.

(Table 12)

4. Discussion

The conducted analysis of somatic types according to the Wanke–Kolasa concept among physiotherapy students from Bydgoszcz between 2021 and 2025 demonstrated overall stability of body structure characteristics, accompanied by minor and irregular fluctuations in selected somatic components. The obtained findings are consistent with observations indicating that, after the completion of the growth period, morphological characteristics in young adults demonstrate limited variability despite ongoing environmental and behavioral changes [1–4]. At the same time, the literature indicates that contemporary environmental factors, including reduced physical activity and changes in dietary habits, may influence body composition and body proportions [5–7].

Among men, the greatest variability was observed for the chest index, with the highest values recorded in 2023, whereas the remaining parameters remained relatively stable over time. This suggests the absence of unidirectional morphological changes and rather a transient nature of the observed fluctuations. Similar findings were reported by Sterkowicz-Przybycień et al., who demonstrated that variability among young men primarily concerns the shoulder girdle and chest components, while the remaining characteristics remain relatively stable [27]. Stability of basic anthropometric parameters among students of medical sciences was also described in studies by Glista et al. [28].

Among women, the greatest changes concerned the chest index in 2021 and fluctuations in shoulder breadth between 2022 and 2025, while the remaining components remained relatively stable. These findings may indicate greater sensitivity of selected somatic characteristics in women to short-term environmental or behavioral changes. According to available literature, variability in female student populations more frequently concerns adipose tissue components and body proportions than skeletal-muscular elements [10,11,33].

Typological analysis demonstrated dominance of the “V” and “I” components among men and the “I” and “Y” components among women, corresponding to a predominance of traits associated with shoulder girdle development and a slender body build. This finding is consistent with previous studies conducted among students of medical sciences and physical education, in which leptosomic and athletic body types predominated [14–16]. It has been suggested that higher levels of physical activity and health-promoting behaviors may facilitate the maintenance of more favorable body proportions [7,17].

Particularly important was the observation of an increased contribution of the “V” component among men in 2025, which was distinctly higher compared with the previous year. Although no persistent trend was observed, this change may reflect a temporary intensification of musculoskeletal adaptations associated with resistance training, the popularity of which has been steadily increasing among young adults [18,31]. However, the lack of monotonicity suggests an unstable character of these changes.

Mixed somatic types predominated in the analyzed population, both among men and women. This pattern is consistent with observations reported by Malina et al., who indicated a gradual reduction in the frequency of clearly homogeneous somatic types in contemporary populations [32]. Diverse environmental conditions and heterogeneous patterns of physical activity may contribute to the emergence of intermediate body structure configurations.

Analysis of temporal trends revealed no significant unidirectional changes in any somatic component. This indicates that the observed differences were fluctuation-based rather than directional in nature. These findings are consistent with reports describing stabilization of morphological characteristics following completion of biological maturation [20,22,37]. At the population level, secular changes primarily concern linear traits, such as body height, whereas somatic proportions undergo considerably slower modifications [15].

Analysis of socioeconomic factors demonstrated no significant influence of time, place of residence size, or parental education level on the somatic composition of the studied students. The only exception concerned the association between maternal education level and the “H” component among women, where lower maternal education was associated with a reduced contribution of this component. This relationship is consistent with previous studies demonstrating associations between socioeconomic status and morphological characteristics as well as body composition [16,34–36]. The absence of a significant influence of paternal education may result from the homogenization of the academic environment and convergence of health-related behaviors within the studied population [7,17].

At the same time, this effect was local in character and did not influence the overall typological structure of the female population, suggesting a limited role of classical socioeconomic indicators in determining somatotype among young adults. It appears that biological factors and physical activity levels may play a more substantial role [5,33].

The absence of clear trends may also result from the relatively short observation period covering only five years. Secular changes in morphological traits are typically identified over longer time horizons or in intergenerational analyses [15,37]. Additionally, the specific nature of the studied group, consisting of physiotherapy students characterized by relatively high health awareness and physical activity levels, may have reduced phenotypic variability [8,17].

The application of the Wanke–Kolasa classification represents an important strength of the study, enabling comparison with previous analyses conducted in Polish populations [12,13]. A limitation of the study is the lack of behavioral data, such as physical activity levels, dietary habits, and direct assessment of body composition using instrumental methods, which limits the possibility of fully interpreting the mechanisms underlying the observed changes [32,33].

5. Conclusions

The conducted analysis indicates high stability of somatic structure among physiotherapy students between 2021 and 2025, accompanied by minor fluctuations of a non-monotonic nature. The absence of significant directional trends confirms that, after the completion of biological maturation, morphological characteristics in young adults demonstrate limited variability, even under conditions of dynamic environmental and lifestyle changes.

The predominance of components corresponding to a slender and relatively athletic body build may reflect the specific characteristics of medical student populations, which are typically associated with higher health awareness and potentially greater levels of physical activity. At the same time, the predominance of mixed somatic types indicates progressive heterogenization of contemporary body structure configurations, similarly observed in other populations of young adults.

The obtained findings suggest a limited role of classical socioeconomic factors in determining somatotype within the studied group. The observed associations were local in nature and did not affect the overall typological structure of the population, which may indicate a homogenizing influence of the academic environment and similar patterns of health-related behaviors.

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Tables:

Table 1. Numerical characteristics of calculated anthropometric indices in male groups.

Year	n	Index (mean ±SD)				
		Trunk length	Shoulder breadth	Hip-to-shoulder	Chest	Rohrer
2021	30	29.92 ±1.97	75.5 ±6.2	67.92 ±5.27	66.2 ±7.59	1.38 ± 0.22
2022	26	30.01 ±3.92	76.19 ±8.7	66.18 ±4.94	66.21 ±6.49	1.34 ± 0.24
2023	46	30.13 ±1.29	74.83 ±5.51	66.83 ±7.71	69.52 ±7.9	1.4 ±0.26
2024	57	30.39 ±1.74	73.66 ±5.1	66.59 ±5.72	66.58 ±8.68	1.35 ± 0.19
2025	48	29.85 ±1.41	76.37 ±6.17	65.07 ±6.71	65.21 ±8.48	1.33 ± 0.23

Mean: average value of analyzed parametr; SD: standard deviation; median: second quartile

Table 2. Numerical characteristics of calculated anthropometric indices in female groups.

Year	n	Index (mean ±SD)				
		Trunk length	Shoulder breadth	Hip-to-shoulder	Chest	Rohrer
2021	65	30.74 ±2.92	70.09 ±6.69	71.91 ±8.53	71.32 ±12.65	1.37 ± 0.17
2022	66	30.75 ±2.33	69.88 ±8.72	70.82 ±8.65	66.6 ±8.62	1.32 ± 0.23
2023	68	30.71 ±2.24	72.44 ±7.94	70.65 ±6.54	67.3 ±7.1	1.38 ± 0.21
2024	86	31.13 ±2.08	70.3 ±5.19	71.72 ±6.08	67.53 ±7.6	1.33 ± 0.22
2025	82	29.97 ±1.81	72.56 ±6.36	70.32 ±6.69	68.5 ±8.95	1.33 ± 0.24

Mean: average value of analyzed parametr; SD: standard deviation; median: second quartile

Table 3. Percentage characteristics of somatic compositions and their formulas in the examined male groups.

Year	n	I (%)	A (%)	V (%)	H (%)	Somatic composition formula
2021	30	30,57	13,98	42,34	13,11	V > I > A > H
2022	26	26,07	12,35	48,05	13,53	V > I > H > A
2023	46	29,46	15,86	38,57	16,11	V > I > A > H
2024	57	31,6	15,17	39,03	14,2	V > I > A > H
2025	48	25,28	11,7	48,62	14,39	V > I > H > A

Table 4. Percentage characteristics of somatic compositions and their formulas in the examined female groups.

Year	n	I (%)	A (%)	Y (%)	H (%)	Somatic composition formula
2021	65	41,94	16,42	29,02	12,63	I > Y > A > H
2022	66	37,07	14,42	35,73	12,78	I > Y > A > H
2023	68	40,8	12,59	34,1	12,51	I > Y > A > H
2024	86	44,3	14,46	29,53	11,71	I > Y > A > H
2025	82	39,57	13,71	33,46	13,26	I > Y > A > H

Table 5. Comparative characteristics of year-to-year percentage changes in somatic compositions among male groups.

Years	I	A	V	H
2021-2022	1	1	1	1
2022-2023	1	0,6038	0,3186	1
2023-2024	1	1	1	1
2024-2025	0,2361	0,3854	0,0489	1

Corrected p-value: statistically significant values are marked in bold p<0.05

Table 6. Comparative characteristics of year-to-year percentage changes in somatic compositions among female groups.

Years	I	A	Y	H
2021-2022	0,6412	1	0,1011	0,4989
2022-2023	1	0,1799	1	0,1977
2023-2024	0,7809	0,3571	0,8724	1
2024-2025	0,4010	0,7181	0,6151	0,0882

Corrected p-value: statistically significant values are marked in bold p<0.05

Table 7. Percentage characteristics of mixed body structure types among male groups.

Year	n	A/H	A/I	H	H/A	H/V	I	I/A	I/V	V	V/H	V/I
2021	30	3,33	6,67	0,00	3,33	0,00	3,33	0,00	33,33	16,67	10,00	23,33
2022	26	0,00	7,69	0,00	3,85	3,85	0,00	0,00	19,23	15,38	7,69	42,31
2023	46	4,35	2.17	0,00	10,87	4,35	4,35	10,87	13,04	13,04	4,35	32,61
2024	57	5,26	3,51	0,00	3,51	3,51	1,75	7,02	22,81	8,77	1,75	42,11
2025	48	0,00	2,08	2,08	2,08	2,08	0,00	2,08	18,75	16,67	6,25	47,92

Table 8. Formulas of male body structure types.

Year	n	Somatic composition formula
2021	30	I/V > V/I > V >V/H > A/I > A/H = H/A = I
2022	26	V/I > I/V > V > A/I = V/H > H/A = H/V
2023	46	V/I > I/V = V > H/A = I/A > A/H = H/V = I > A/I
2024	57	V/I > I/V > V > I/A > A/H > A/I = H/A = H/V > I = V/H
2025	48	V/I > I/V > V > V/H > A/I = H = H/A = H/V = I/A

Table 9. Percentage characteristics of mixed body structure types among female groups.

Year	n	A	A/H	A/I	H/A	H/I	H/Y	I	I/A	I/H	I/Y	Y	Y/H	Y/I
2021	65	1,54	0,00	4,62	1,54	0,00	0,00	10,77	15,38	3,08	36,92	9,23	1,54	15,38
2022	66	0,00	1,52	4,55	0,00	0,00	0,00	4,55	12,12	1,52	36,36	10,61	1,52	27,27
2023	68	0,00	0,00	1,47	1,47	1,47	0,00	10,29	7,35	1,47	32,35	7,35	0,00	36,76
2024	86	1,16	0,00	0,00	1,16	1,16	0,00	12,79	12,79	1,16	32,56	4,65	0,00	32,56
2025	82	0,00	1,22	2,44	1,22	0,00	1,22	10,98	7,32	2,44	28,05	2,44	1,22	41,46

Table 10. Formulas of female body structure types.

Year	n	Somatic composition formula
2021	65	I/Y > I/A = Y/I > I > Y > A/I > I/H > A = H/A = Y/H
2022	66	I/Y > Y/I > I/A > Y > A/I = I > A/H = I/H = Y/H
2023	68	Y/I > I/Y > I > I/A = Y > A/I = H/A = H/I = I/H
2024	86	I/Y >=Y/I > I = I/A > Y > A = H/A = H/I = I/H
2025	82	Y/I > I/Y > I > I/A > A/I = I/H = Y > A/H = H/A = H/Y = Y/H

Table 11. Analysis of time-dependent changes in somatic compositions.

Variable	Alternative hypothesis: monotonic trend		Alternative hypothesis: increasing trend		Alternative hypothesis: decreasing trend	
	male	female	male	female	male	female
I	0,8135	0,9134	0,5933	0,5433	0,4067	0,4667
A	0,7992	0,1587	0,3996	0,9207	0,6004	0,0793
V/Y	0,3407	0,4508	0,1703	0,2254	0,8297	0,7746
H	0,6400	0,8512	0,3200	0,5744	0,6800	0,4256

p-value: statistically significant values are marked in bold p<0.05

Table 12. Effects of time, place of residence size, and parental education on somatic compositions in male and female groups.

	I		A		V\Y		H	
	Małe							
	coef	p-value	coef	p-value	coef	p-value	coef	p-value
Constant	32,9229	<0,0001	14,5098	<0,0001	40,2150	<0,0001	12,3526	<0,0001
Group	-0,7091	0,4036	-0,4802	0,3755	1,1276	0,3326	0,0618	0,9130
Father – vocational education	-1,2748	0,7048	-3,7730	0,0800	4,8183	0,2966	0,2290	0,9187
Father – secondary education	1,8511	0,5171	-1,5521	0,3949	-1,5154	0,6987	1,2156	0,5238
Mother – vocational education	0,3404	0,9412	0,6088	0,8363	0,7063	0,9111	-1,6530	0,5917
Mother – secondary education	-0,3130	0,9156	1,8583	0,3249	-1,4813	0,7145	-0,0649	0,9737

Rural area	-0,7378	0,8305	0,4445	0,8399	-0,9541	0,8399	1,2457	0,5882
Small town	-4,9743	0,1814	4,2824	0,0719	-4,0069	0,4314	4,6987	0,0590
Large city	-4,7902	0,1946	1,2331	0,6001	2,9874	0,5544	0,5699	0,8167
	Female							
Constatn	37,2049	<0,0001	14,9531	<0,0001	35,5608	<0,0001	12,2839	<0,0001
Group	0,4953	0,4988	-0,5689	0,0896	0,1176	0,8820	-0,0444	0,8464
Father – vocational education	-1,6520	0,5571	0,4781	0,7099	-0,1279	0,9665	1,3017	0,1399
Father – secondary education	-1,9873	0,4502	1,3362	0,2666	0,5346	0,8511	0,1174	0,8866
Mother – vocational education	4,3068	0,1828	-1,4628	0,3217	0,2154	0,9509	-3,0594	0,0026
Mother – secondary education	3,3812	0,1877	0,3608	0,7580	-1,8773	0,4989	-1,8646	0,0206
Rural area	2,1691	0,4992	0,1219	0,9337	-3,3625	0,3334	1,0699	0,2871
Small town	2,3850	0,4657	0,6485	0,6640	-4,4797	0,2060	1,4434	0,1588
Large city	3,9212	0,3068	-0,8951	0,6094	-3,2535	0,4334	0,2262	0,8505

ef: linear regression model coefficient of the variable; p-value: statistically significant values are marked in bold p<0.05

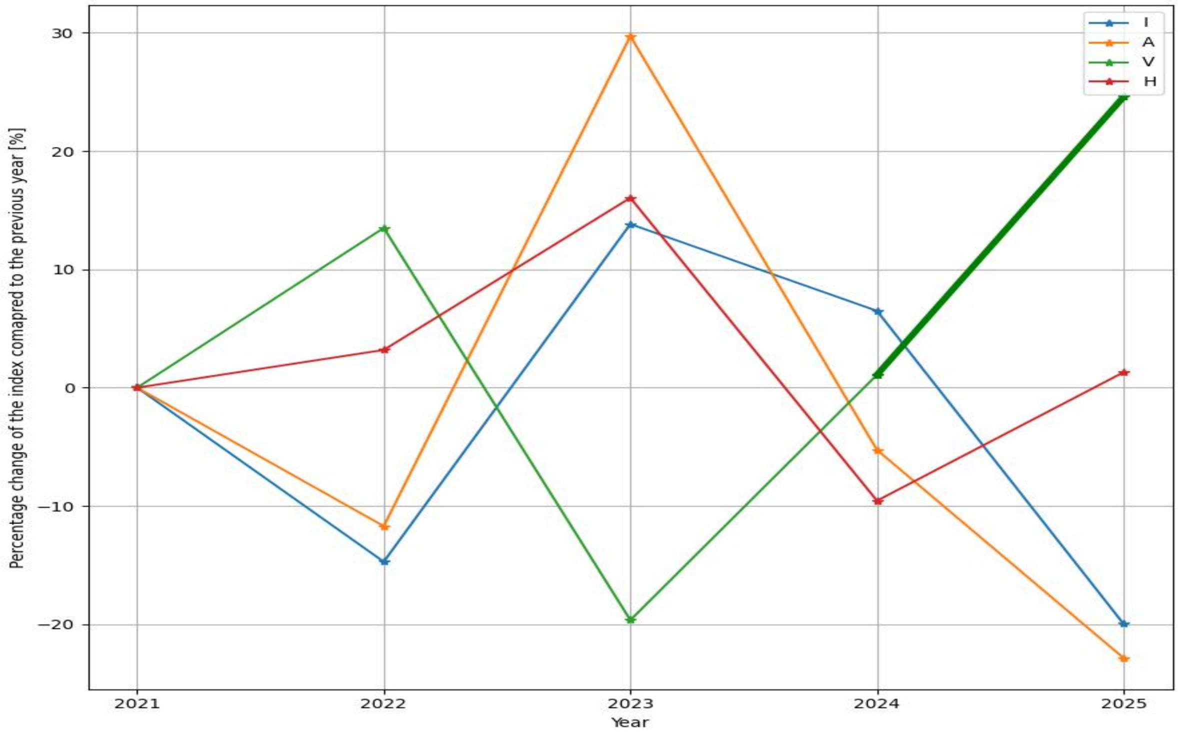

Figure 1. Graphical presentation of percentage changes in male somatic compositions relative to the preceding year.

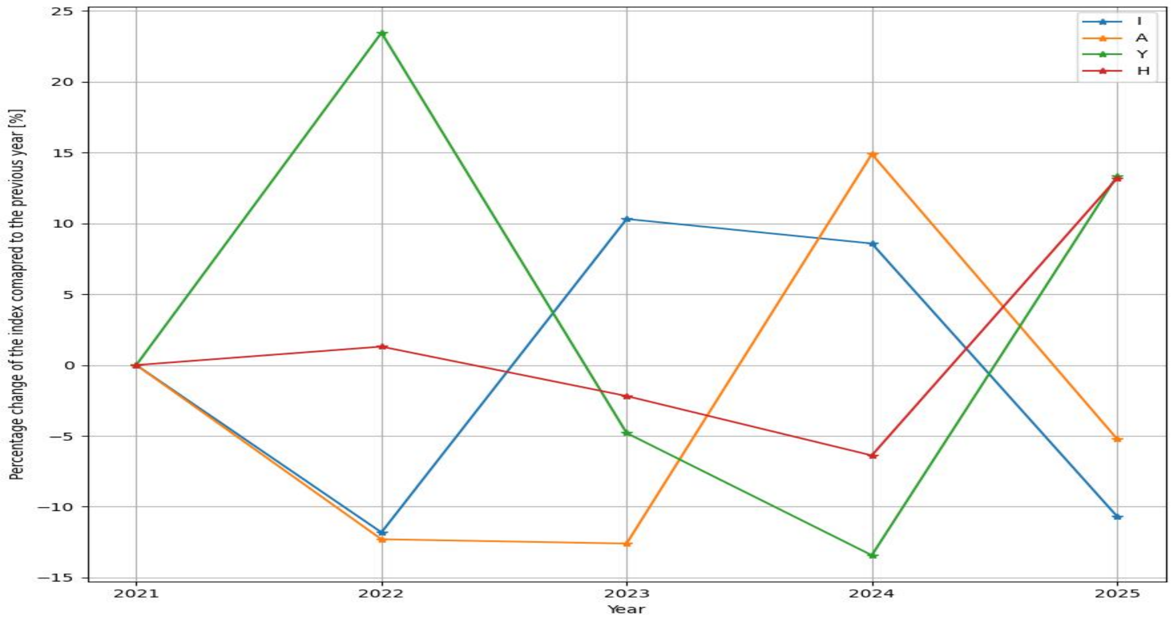

Figure 2. Graphical presentation of percentage changes in female somatic compositions relative to the preceding year.