

LINKS BETWEEN ADOLESCENTS' SUBJECTIVE HEALTH ASSESSMENT, TYPE OF PHYSICAL ACTIVITY AND POSTURE

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Abstract

Schooling period is particularly important for posture formation because during this period pupils grow and develop quickly, bones and their commissures are intensively forming. The child should also get knowledge about hygiene and healthy lifestyle but still more significance is attached to physical exercises, active physical activities, strengthening all body muscles. 60 eighth form pupils at the age from 13 to 14 years participated in the research. The majority of adolescents choose more than one kind of physical activity but physical education lessons remain the main occupation during which children engage in physical activities. More than a half of adolescents do exercises on their own, less than a half of them go to workouts or the sports club.

Key words: *adolescents' posture, spinal mobility, health, physical activeness.*

Problem of the Research

Posture is not only our outer image which we notice having seen a person. It determines the perception of the *Self*, self-confidence and acknowledgement (Adaškevičienė, 2008). According to Girskis (2011), Balčiūnienė (2009), posture not only represents harmonious development of the person but is also a mirror of good health, self-feeling, mental and emotional state. Kendall, McCreary, Provance, Rodgers, & Romani (2005) describe good posture as a good habit which affects the person's good self-feeling. According to Mallau, Vaugoyeau, & Assaiante (2010), posture monitoring depends on a complicated complex of senses; i.e., sight, hearing, touch, arising from such sensory sources as muscles, skin and joints. Raudoniūtė (2010) states that in the presence of irregular posture or slight spinal deformity a person may not complain of anything and even not notice the formed deformation. If no preventive measures are taken and the person wants to preserve regular posture, in the course of time irregular posture progresses determining spinal problems (back pain, the possibility of intervertebral disc rupture, etc.). According to Astašenko (2008), poor posture can be one of the reasons causing depression, sleeplessness, constant fatigue and other problems.

In the opinion of many scientists (Arcinavičius, Kesminas, & Milčarek, 2004; Hesas, Éderis, & Montagas, 2005; Dadelienė, 2006; Adaškevičienė, 2008), schooling period is particularly important for posture formation because during this period pupils grow and develop quickly, bones and their commissures are intensively forming. In their works scientists (Adaškevičienė, 2004, 2008; Gasparkienė, 2004; Volbekas, 2004) analyse importance of developing children's regular posture. In Adaškevičienė's (2004) opinion, if one wants the child's nice and regular posture, it is necessary to look after it during all childhood period; i.e., from the child's birth, in early and late childhood and in adolescence. Posture is being developed when the perception of the child's straight, nice body image is formed, self-monitoring of the child's posture and self-control are promoted, constantly encouraging the child to observe, analyse and assess his/her posture. The child should also get knowledge about hygiene and healthy lifestyle but still more significance is attached to physical exercises,

active physical activities, strengthening all body muscles (Adaškevičienė, 2004). Graham, Holt/Hale, & Parker (2010) reveal that it is not only important to choose physical exercises according to the child's age, abilities and individual features. In addition, it is very important that physical exercises should become part of children's daily activities, delight the child and that the child should do them with pleasure.

According to the data of the Department of Statistics of the Republic of Lithuania, as of 2013, 27.4 out of 1000 children have irregular posture and 23.2, scoliosis. Irregular posture cases are most often identified for children between 10 and 14 years of age. According to Adaškevičienė (2008), usually irregular posture is most often diagnosed for 11-15 year old adolescents when it is quite distinct. According to the data of Šiauliai city Public Health Bureau, as of 2013, among pupils (1-12 forms) who did a prophylactic checkup, disorders of skeletal-muscular system were identified for 2495 (19,7 per cent) pupils, 431 (3,4 per cent) of whom had scoliosis, and 1424 (11,2 per cent), irregular posture. There are much less healthy children (2006 (29,1 per cent)) than children with health problems (4898 (70,9 per cent)) in Šiauliai city progymnasiums. Data of Šiauliai city Public Health Bureau disclose that in addition to the reducing number of pupils in schools, the number of healthy pupils learning in schools is reducing too. Therefore, it is very important to point out children's health indicators, discover the factors that may be affecting worsening of pupils' health and reveal pupils' attitude to their health, posture and its assessment.

Aim of the research: to disclose the effect of subjective assessment of health and physical activity on adolescents' posture.

Subject of the research: links between adolescents' posture, subjective assessment of health and physical activity.

Research methods

1. Questionnaire survey
2. Assessment of posture and spinal mobility employing standardised test (Schober)

Research participants

The research was attended by 60 eighth form pupils, aged 13-14 years, from one progymnasium of Šiauliai city. There were 27 female pupils and 33 male pupils. Out of all adolescents who took part in the research 45 are physically active, 7 are physically inactive and 8 adolescents state that they do not have opinion about their physical activeness.

Organization and Methods of the Research

The research employed anonymous questionnaire about aspects of pupils' healthy lifestyle, which was drawn up based on scientific literature. The questionnaire consisted of five blocks: 1) demographic and general data, 2) attitude to health and healthy lifestyle, 3) subjective assessment of health, 4) knowledge about health and its determinants, 5) components of healthy lifestyle. Out of a total of 870 eighth form pupils who were questioned employing the questionnaire in Šiauliai city, posture was assessed using Schober's standardized test for 60 of them. Schober's test was intended for assessment of spinal mobility. Assessing spinal mobility, the following was assessed: side leaning; breast area (C7-T12); breast-waist area (C7-S1); waist area (T12-S1); spine stretching (C7-S1). Side leaning was assessed using the tape-measure, measuring the distance from middle fingers of the right hand and the left hand to the floor, standing straight and being leaned. Other indicated areas are assessed using the tape-measure to measure the distance in the indicated areas, standing straight and being leaned. The received difference between the distance standing straight and the distance being leaned is compared with the established norm. Based on Schober's methods, the test was supplemented with measurements: the distance from C7 to scapulas and the distance from the corners of scapulas to the spine, standing straight and being leaned.

Data of posture assessment (N=60) were compared with data of the questionnaire of the target group, considering the following questions given in the questionnaire: Assessment of own health status; Assessment of own physically activity; Places of engagement into physical activity.

Research data analysis was conducted employing SPSS (Statistical Packet for Social Sciences 19.0). Frequencies, means and standard deviation were calculated in the research (Pukėnas, 2005).

Results of the Research

Seeking to disclose the links of posture of the target group with the subjective health assessment and the type of physical activity, the data were analysed considering the following questions of the questionnaire. Table 1 presents the data of assessing posture and spinal mobility, which are compared considering the question about own health care. Better data of assessing static posture are noticed among the respondents who indicated that they looked after their health sometimes and often than among the respondents who took care of their health always and rarely. Mobility of breast and breast-waist areas is best among the respondents who indicate that they look after their health sometimes (3,67 cm; 10,5 cm). Mobility of waist area is best among those respondents who look after their health often (7,35 cm). Too big or too little mobility of waist area affects the formation of inappropriate body position, pose, there is an increased possibility of the appearance of back pain, traumas, micro-traumas and irregular posture formation. Assessment data of spine stretching are better among those who indicate that they often (2,91 cm) and always (2,92 cm) look after their health. Considering general posture assessment data, it can be stated that smaller features of irregular posture show up among the respondents who sometimes and often look after their health. Standard deviation data disclose that the differences of distance from corners of scapulas to C7, standing straight, are similar among all respondents who look after their health sometimes (SD-0,84), often (SD-0,79) and always (SD-0,86). The difference reaches about one centimetre. More distinct asymmetric posture differences, observed among all respondents, are noticed being leaned. Spinal mobility in breast and waist areas is too big in all target groups; this can be influenced by weak spinal muscles. Mobility of spine stretching is too big among those respondents who sometimes (3,33 cm) and rarely (5 cm) take care of their health.

Table 1. Links between Adolescents' Posture and Subjective Health Assessment, Means (cm)

Indicators of static posture and spinal mobility	Care about own health status			
	Rarely (N=1)	Sometimes (N=12)	Often (N=34)	Always (N=13)
Difference between left and right, standing straight (SD)	0	1,5 (1,45)	1,12 (1,07)	1,77 (1,59)
Difference between left and right, being leaned (SD)	2	2,25 (1,42)	2,09 (1,82)	2,08 (1,8)
Difference of distance between corners of scapulas and C7 (standing straight) (SD)	2	1,17 (0,84)	0,74 (0,79)	1,08 (0,86)
Difference of distance between corners of scapulas and C7 (being leaned) (SD)	2	1,25 (1,36)	1,15 (0,96)	0,92 (0,86)
Mobility of breast area C7-Th12(Norm-2,7 cm) (SD)	4	3,67 (1,72)	4,09 (1,58)	3,92 (1,19)
Mobility of breast-waist area C7-S1 (Norm - 10 cm) (SD)	12	10,5 (1,73)	10,06 (2,49)	10,92 (1,85)
Mobility of waist area Th12-S1 (Norm -7,5 cm) (SD)	7	8,08 (2,15)	7,35 (1,92)	8,62 (1,98)

Indicators of static posture and spinal mobility	Care about own health status			
	Rarely (N=1)	Sometimes (N=12)	Often (N=34)	Always (N=13)
Spine stretching C7-S1 (Norm-2,5 cm) (SD)	5	3,33 (2,67)	2,91 (1,46)	2,92 (0,95)

Note: SD – standard deviation

Table 2 presents the assessment data of posture and spinal mobility, which are compared considering the question of own health assessment. Out of 60 respondents 17 respondents indicated that they assessed their health as satisfactory, 31, as good and 12 respondents assessed their health as very good. The biggest share of respondents assessed their health as good (N=31). Asymmetric posture of all respondents is more distinct being leaned than standing straight. The difference of distance between the corners of left and right side scapulas and C7 is the least when the person is standing straight. Mobility of breast area is too big among all respondents. However, the difference is the biggest among those who assess their health as satisfactory (4,12 cm) and as very good (4,17). Mobility of breast-waist area is the best among those respondents who assess their health as good (9,9 cm). Mobility of breast-waist area is too big (10,71 cm; 11,08 cm) among those respondents who assess their health as satisfactory and good. Mobility of waist area is assessed as good among those respondents who assess their health as satisfactory and good. Mobility of waist area of those who assess their health as very good is too big (8,58 cm). Mobility of spine stretching is too big (3,26cm) among those respondents who assess their health as good. Mobility of spine stretching almost corresponds to the established norm (2,5 cm) among those respondents who assess their health as satisfactory and very good. Considering the data of standard deviation, it was noticed that posture assessment results are similar among all respondents, assessing the distance between corners of scapulas and C7, standing straight and being leaned.

Table 2. Links between Adolescents' Posture and Subjective Health Assessment, Means (cm)

Indicators of static posture and spinal mobility	Assessment of own health		
	Satisfactory (N=17)	Good (N=31)	Very good (N=12)
Difference between left and right, standing straight (SD)	1,06 (1,14)	1,32 (1,22)	1,67 (1,61)
Difference between left and right, being leaned (SD)	1,65 (1,32)	2,16 (1,51)	2,67 (2,47)
Difference of distance between corners of scapulas and C7 (standing straight) (SD)	1 (0,87)	0,94 (0,81)	0,75 (0,87)
Difference of distance between corners of scapulas and C7 (being leaned) (SD)	1,24 (1,25)	0,97(0,88)	1,42 (0,99)
Mobility of breast area C7-Th12 (Norm ~2,7 cm) (SD)	4,12 (1,9)	3,81 (1,30)	4,17 (1,47)
Mobility of breast-waist area C7-S1 (Norm ~ 10 cm) (SD)	10,71 (2,31)	9,9 (2)	11,08 (2,47)
Mobility of waist area Th12-S1 (Norm ~7,5 cm) (SD)	7,41 (2,27)	7,65 (1,62)	8,58 (2,43)
Spine stretching C7-S1 (Norm ~2,5 cm) (SD)	2,82 (1,24)	3,26 (2,02)	2,75 (1,22)

Note: SD – standard deviation

Analysing links between adolescents' posture and subjective health assessment (Table

1 and Table 2), it was noticed that posture assessment data of adolescents who rarely take care of their health are worse than of the ones who take care of it sometimes, often and always. Posture data of adolescents who assess their health as good are better than of other adolescents who assess their health as satisfactory or very good.

Table 3 presents the assessment data of posture and spinal mobility, which are compared in the aspect of persons physically activity. Out of 60 respondents 45 adolescents indicated that they were physically active, 7 were physically inactive and 8 adolescents did not have opinion about their physical activeness. The difference between the left side and the right side, standing straight, is better among physically inactive adolescents (1 cm) and among those who do not have their opinion (1 cm) but being leaned, the difference of this area increases up to 2,29 cm; 2,13 cm. The difference of physically active adolescents between left and right, standing straight, is 1,42 cm; being leaned, it increases up to 2,09 cm. Less increase of the difference demonstrates that the balance of side waist muscles of physically active adolescents is better than of physically inactive adolescents. The difference of distance between corners of scapulas and C7 is better (0,87 cm) among physically active adolescents. The difference among physically inactive adolescents is bigger 1,29. However, being leaned, the difference of distance between corners of scapulas and C7 is bigger among physically active adolescents (1,16 cm) than physically inactive adolescents (0,86 cm). Mobility of breast, breast-waist and waist areas is better among physically active adolescents (3,84 cm; 10,51 cm; 7,8 cm) than among physically inactive adolescents. Mobility of breast area of all respondents is bigger than the established norm. Physically inactive adolescents' spine stretching mobility is too big (4 cm). Standard deviation data demonstrate that assessment results of distance between corners of scapulas and C7, standing straight, are similar among all respondents (SD ~1), compared to the assessment results of other areas.

Table 3. Links between Adolescents' Posture and Physical Activeness, Means (cm)

Indicators of static posture and spinal mobility	Physical activity		
	Physically active (N=45)	Physically inactive (N=7)	Do not have opinion (N=8)
Difference between left and right, standing straight (SD)	1,42 (1,25)	1 (1,91)	1 (0,76)
Difference between left and right, being leaned (SD)	2,09 (1,73)	2,29 (1,49)	2,13 (1,89)
Difference of distance between corners of scapulas and C7 (standing straight) (SD)	0,87 (0,81)	1,29 (1,11)	0,88 (0,64)
Difference of distance between corners of scapulas and C7 (being leaned) (SD)	1,16 (1,02)	0,86 (0,9)	1,25 (1,17)
Mobility of breast area C7-Th12 (Norm ~2,7 cm) (SD)	3,84 (1,44)	4 (1,63)	4,63 (1,77)
Mobility of breast-waist area C7-S1 (Norm ~10 cm) (SD)	10,51 (2,28)	9,14 (2,27)	10,63 (1,51)
Mobility of waist area Th12-S1 (Norm ~7,5 cm) (SD)	7,8 (2,07)	7,29 (1,89)	8 (1,85)
Spine stretching C7-S1 (Norm ~2,5 cm) (SD)	2,93 (1,56)	4 (2,58)	2,75 (1,28)

Note: SD – standard deviation

Table 4 presents the assessment data of posture and spinal mobility, which are compared considering the question about the place of person's engagement in physical activity. Out of

60 respondents 43 adolescents indicated that they attended physical education lessons; 23, workouts; 15, the sports club; 35, did exercises on their own; 5 adolescents attended the dance club. Considering the type of adolescents' physical activity, it can be stated that the majority of respondents choose more than one type of physical activity. However, physical education lessons are the main kind of physical activity. The difference between the left side and the right side, standing straight, is the biggest (1,61 cm) among adolescents who attend workouts and the least (1,13 cm), among adolescents who attend the sports club. Being leaned to the side, the difference between the left side and the right side is the biggest (2,4 cm) among those adolescents who attend the dance club and the least (1,87 cm), among adolescents who attend the sports club. Assessing this area, there should be no difference; i.e., left must be equal to right. The difference of distance between corners of scapulas and C7, standing straight, is the biggest (1,20 cm) among adolescents who attend the dance club and the least (0,78 cm), among adolescents who go to workouts. Being leaned, the difference of adolescents who attend the dance club reduces down to 1 cm, the difference of other respondents, being leaned, increases but not much. Analysing the results of spinal mobility, it was noticed that spinal mobility of adolescents who attended the dance club is the biggest, compared with other respondents. Such assessment results can be influenced by specificity of the activity chosen by adolescents. However, it is very important to point out that too big spinal mobility and flexibility can affect the possibility of the appearance of spine problems if muscles are not correspondingly strengthened. Best breast mobility data are among adolescents who go to workouts. Mobility of breast-waist area is the best (10,02 cm; 7,49 cm) among adolescents who attend physical education lessons or the sports club; data correspond to the established norms. Mobility of spine stretching is the best (2,67 cm) among respondents who attend the sports club. Standard deviation data help to reveal that all target group has similar posture differences, assessing the distance between corners of scapulas and C7, standing straight and being leaned (SD ~1).

Table 4. Links between Adolescents' Posture and Type of Physical Activity, Means (cm)

Indicators of static posture and spinal mobility	Place of persons engagement into physical activity				
	Go to physical education lessons (N=43)	Go to workouts (N=23)	Go to sports club (N=15)	Do exercises on their own (N=35)	Go to dance club (N=5)
Difference between left and right, standing straight (SD)	1,28 (1,24)	1,61 (1,27)	1,13 (0,99)	1,46 (1,50)	1,20 (1,64)
Difference between left and right, being leaned (SD)	2,19 (1,8)	2,35 (1,30)	1,87 (1,19)	1,97 (1,95)	2,40 (1,52)
Difference of distance between corners of scapulas and C7 (standing straight) (SD)	0,84 (0,72)	0,78 (0,8)	0,93 (0,88)	1,06 (0,94)	1,20 (0,84)
Difference of distance between corners of scapulas and C7 (being leaned) (SD)	1,09 (1,09)	0,91 (0,67)	1,07 (0,79)	1,23 (1,17)	1 (0,71)
Mobility of breast area C7-Th12 (Norm ~2,7 cm) (SD)	3,93 (1,47)	3,70 (1,22)	3,73 (1,16)	3,86 (1,48)	4,20 (1,64)
Mobility of breast-waist area C7-S1 (Norm ~10 cm) (SD)	10,02 (2,09)	10,70 (2,34)	9,47 (1,85)	10,11 (2,23)	11,20 (2,39)
Mobility of waist area Th12-S1 (Norm ~7,5 cm) (SD)	7,49 (1,97)	8,61 (1,85)	7,47 (1,95)	7,74 (2,08)	8 (1,87)

Spine stretching C7-S1 (Norm ~2,5 cm) (SD)	3,02 (1,71)	2,83 (1,40)	2,67 (1,23)	3,14 (1,68)	4 (2)
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Note: SD – standard deviation

Analysing the links between the type of adolescents' physical activity and posture (Table 3 and Table 4), it was noticed that physically active adolescents' posture is better than the posture of physically inactive adolescents and of those who do not have opinion about their physical activeness. Considering the type of the physical activity, it can be stated that better posture is characteristic to those adolescents who attend the sports club or physical education lessons. Posture assessment data of adolescents who go to the dance club, considering the established standards, are far worse than of other adolescents.

Conclusions

1. The majority of adolescents look after their health often but assess their health as good. More than a half of adolescents indicated that they were physically active; the remaining share indicated that they were physically inactive or did not have opinion about their physical activeness. Adolescents who do sports on their own have to receive sufficient knowledge about organisation, dosage of physical activities, benefit and possible harm of physical exercises.
2. Mobility of breast area and spine stretching, spinal mobility among all adolescents is too big, assessing according to the established norm. Analysing links between adolescents' posture and subjective health assessment, it was noticed that posture assessment data of adolescents who rarely took care of their health were worse than the ones of adolescents who sometimes, often and always looked after their health. Posture of physically active adolescents is better than the one of physically inactive adolescents.
3. Considering the type of physical activity, it can be stated that posture is better among adolescents who go to the sports club or physical education lessons. Posture assessment data of adolescents who go to the dance club, considering the established standards, are far worse than of other adolescents. Such assessment results may be affected by specificity of the activity chosen by the target group.

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Summary

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Posture is not only our outer image which we notice having seen a person. It determines the perception of the *Self*, self-confidence and acknowledgement (Adaškevičienė, 2008). According to Girskis (2011), Balčiūnienė (2009), posture not only represents harmonious development of the person but is also a mirror of good health, self-feeling, mental and emotional state. Kendall, McCreary, Provance, Rodgers and Romani (2005) describe good posture as a good habit which affects the person's good self-feeling. According to Mallau, Vaugoyeau, Assaiante (2010), posture monitoring depends on a complicated complex of senses; i.e., sight, hearing, touch, arising from such sensory sources as muscles, skin and joints. Raudoniūtė (2010) states that in the presence of irregular posture or slight spinal deformity a person may not complain of anything and even not notice the formed deformation. If no preventive measures are taken and the person wants to preserve regular posture, in the course of time irregular posture progresses determining spinal problems (back pain, the possibility of intervertebral disc rupture, etc.). According to Astašenko (2008), poor posture can be one of the reasons causing depression, sleeplessness, constant fatigue and other problems. **Aim of the research:** to disclose the effect of subjective assessment of health and physical activity on adolescents' posture. **Subject of the research:** links between adolescents' posture, subjective assessment of health and physical activity. **Research methods:** Questionnaire survey, Assessment of posture and spinal mobility employing standardised test (Schober). **Research participants.** The research was attended by 60 eighth form pupils, aged 13-14 years, from one progymnasium of Šiauliai city. There were 27 female pupils and 33 male pupils. Out of all adolescents who took part in the research 45 are physically active, 7 are physically inactive and 8 adolescents state that they do not have opinion about their physical activeness. **Organization and Methods of the Research.** The research employed anonymous questionnaire about aspects of pupils' healthy lifestyle, which was drawn up based on scientific literature. The questionnaire consisted of five blocks: 1) demographic and general data, 2) attitude to health and healthy lifestyle, 3) subjective assessment of health, 4) knowledge about health and its determinants, 5) components of healthy lifestyle. Out of a total of 870 eighth form pupils who were questioned employing the questionnaire in Šiauliai city, posture was assessed using Schober's standardized test for 60 of them. Schober's test was intended for the assessment of spinal mobility. Assessing spinal mobility, the following was assessed: side leaning; breast area (C7-T12); breast-waist area (C7-S1); waist area (T12-S1); spine stretching (C7-S1). Side leaning was assessed using the tape-measure, measuring the distance

from middle fingers of the right hand and the left hand to the floor, standing straight and being leaned. Other indicated areas are assessed using the tape-measure to measure the distance in the indicated areas, standing straight and being leaned. The received difference between the distance standing straight and the distance being leaned is compared with the established norm. Based on Schober's methods, the test was supplemented with measurements: the distance from C7 to scapulas and the distance from the corners of scapulas to the spine, standing straight and being leaned. Data of posture assessment (N=60) were compared with data of the questionnaire of the target group, considering the following questions given in the questionnaire: Assessment of own health status; Assessment of own physically activity; Places of engagement into physical activity. Research data analysis was conducted employing SPSS (Statistical Packet for Social Sciences 19.0).

Results of the research let to draw **conclusions**: The majority of adolescents look after their health often but assess their health as good. More than a half of adolescents indicated that they were physically active; the remaining share indicated that they were physically inactive or did not have opinion about their physical activeness. Adolescents who do sports on their own have to receive sufficient knowledge about organisation, dosage of physical activities, benefit and possible harm of physical exercises. Mobility of breast area and spine stretching, spinal mobility among all adolescents is too big, assessing according to the established norm. Analysing links between adolescents' posture and subjective health assessment, it was noticed that posture assessment data of adolescents who rarely took care of their health were worse than the ones of adolescents who sometimes, often and always looked after their health. Posture of physically active adolescents is better than the one of physically inactive. Considering the type of physical activity, it can be stated that posture is better among adolescents who go to the sports club or physical education lessons. Posture assessment data of adolescents who go to the dance club, considering the established standards, are far worse than of other adolescents. Such assessment results may be affected by specificity of the activity chosen by the target group.