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Original research article

The quality of health of the Czech population at the age of 40+ using the Short Form – 36 (SF-36) questionnaire

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Abstract

Cardiovascular diseases are one of the main causes of death in many developed countries as well as developing countries. Health support and preventative activities are significant in health care as well as nursing. The main goal was to map the contemporary state of the prevention of cardiovascular diseases in people at the age of 40 and older.

We aimed to find the level of the prevention of cardiovascular diseases, the largest drawbacks from the people's point of view, and the people's ideas on how to increase the effectiveness of such prevention. The goal of this study was to verify the Czech version of the shortened version of the SF-36 questionnaire.

We used a quantitative methodology with questionnaires. In one part, we used the RAND 36 – Item Health Survey (SF-36) standardized questionnaire, which is used for finding out the quality of life regarding health. The Czech version of this questionnaire was verified in 2016 using 1,992 people at the age of 40 and older.

Czech citizens at the age of 40 and older best assessed the social domain. Their quality of life is at a high level regarding the emotional domain (low level of emotional problems). On the contrary, vitality (energy/fatigue) and total health had worse assessments. The differences between men and women regarding individual domains are minimal. With age, the quality of life in this area is lower.

The Czech version of the Short Form – 36 questionnaire is used a lot in the Czech Republic. It was validated when it was used in our sample group. The research provided the primary data that allowed statistical calculations and the application of testing criteria so that it was possible to create the norms of this questionnaire that could be applied in the Czech Republic.

Keywords: Measuring tool; Prevention of cardiovascular disease; Quality of life; Reliability; Validity

Introduction

Globally, cardiovascular diseases are the main cause of death and invalidity. Although they are preventable, their incidence is unsatisfactory in the Czech Republic as well. These diseases significantly affect the quality of life of the diseased and increase financial costs for treatment and possible complication solving. The prevention of cardiovascular diseases is a necessary part of the complex approach of medical workers. Nursing, with its orientation on health, plays an important role in prevention. Nurses pay much attention to the education of patients regarding prevention because changes to their lifestyle can decrease the risk of cardiovascular diseases. It is necessary that people have sufficient knowledge in this area and realize that they can affect their health by the right behaviour.

The main goal of this research was to find the level of prevention of cardiovascular diseases, the largest drawbacks from the people's point of view, and the people's ideas on how to increase the effectiveness of such prevention. However, we wanted to use this study to verify the Czech version of the SF-36 questionnaire for the Czech population at the age of 40 and older.

Materials and methods

Research strategies

For the collection of data, we used two types of questionnaires. The non-standardized questionnaire monitored the subjectively assessed education level regarding the prevention of cardiovascular diseases. We also wanted to find the time demand for the carried out health-education intervention – and the extent and content of the education (including its barriers). The respondents were also given the RAND 36 – Item Health Survey (SF-36) standardized questionnaire, which is used for subjectively perceived quality of life regarding health. The SF-36 is the abbreviation for short form and it contains 36 questions.

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It is also possible to use the SF-36 questionnaire to identify all physical and psychological health problems and in clinical practice. The questionnaire was published in 1992 (Ware and Sherbourne, 1992). It was often used in many medical and nursing fields and it has spread a lot.

It is designed so that people over the age of 14 can fill it in by themselves or use a trained interviewer in person or over the telephone. All three models have successfully been used in different forms and with different instructions. The SF-36 questionnaire is sensitive to all physical and psychological health problems. It contains 36 questions divided into 8 domains. Every question has a few suggested answers on a scale.

Data collection

The field research was carried out by face-to-face interviews. The final form of the sheet was based on the results of the pre-research. The research was anonymous, the participation in it was voluntary and it did not contain ethically disputable questions. The field research in the Czech Republic was carried out between the 1st and 20th of April 2016.

The data collection was secured by 582 professional interviewers from the Institute for Studying Health and Lifestyle in the Czech Republic. Data cleaning (optical, logical control, coding and uploading the data to the computer), analyses and result interpretations were carried out by the workers of the same institute.

Statistical data processing was carried out using the SASD 1.4.12 (Statistical Analysis of Social Data) software, which enabled multiple data classification and contingency table processing, and the IBM SPSS 20 software, which enabled the application of tests based on the character of variables. We especially monitored the differences between the SF-36 domains and sociodemographic characteristics. Here, the levels of differences between selected indicators were tested on the grounds of parametric and non-parametric tests (*t*-test, Kruskal–Wallis test). We also tested the level of the correspondence of other standards of this questionnaire that are used as normative in the Czech Republic (Wilcoxon signed-rank test). All of this was on the 95% significance level. In the process, when we found statistical significance, the difference was tested for relevant significance (the testing corresponded with the used statistical test: Fisher's eta^2 and Cohen's d (Sigmund and Sigmund, 2012). Based on these analyses, we carried out the interpretation of data and processed tables and charts.

Sample group

The sample group included citizens of the Czech Republic (2016). The participants were selected in quotas so that the structure corresponds with all Czech citizens regarding regions, gender and age. These indicators were set as representative. The sample group included a total of 1,992 people (Tóthová et al., 2019, p. 15).

There were 937 (47%) men and 1,055 (53%) women, which corresponds with the analogue structure of Czech citizens at the age of 40 and older. Regarding relative numbers, the deviation between the sample group and the basic group was 0.1%. Therefore, the research is representative of the people of the Czech Republic and their gender.

In comparison to the age classification of the basic group, the deviation does not exceed 0.2%. We can say that the results are representative of individual groups of people at the age of 40 and older.

We used the regional classification from 2001. In comparison to the classification of the basic group, the maximum deviation is 0.7%. The results are representative regarding gender, age and region.

Table 1. Age groups by gender

	Men	Women
40–49 years	14.3%	13.8%
50–59 years	12.1%	12.3%
60–69 years	11.9%	13.6%
70–79 years	6.3%	8.4%
80 and older	2.4%	4.9%

In comparison to the age classification of the basic group, the deviation does not exceed 0.2%. We can say that the results are representative of individual groups of people at the age of 40 and older.

We used the regional classification from 2001. In comparison to the classification of the basic group, the maximum deviation is 0.7%. The results are representative regarding gender, age and region.

Results and discussion

The quality of health of the citizens of the Czech Republic at the age of 40 and older by the SF-36

The SF-36 standardized questionnaire has been used for measuring subjective assessment of the quality of life regarding physical and psychological health. The questionnaire contains 36 questions divided into 8 domains. The domains are as follows: PF – physical functioning; RP – role-physical; BP – bodily pain; GH – general health; VT – vitality; SF – social functioning; RE – role-emotional; MH – mental health. The values of the SF-36 scale are from 0 to 100, where 0 means the worst and 100 the best quality of life regarding the given domain.

To compare the quality of health in individual domains, we included all monitored cases (N = 1992). In input analyses, we carried out standard calculations of descriptive statistics and tested normal layout using the Kolmogorov–Smirnov test at $p < 0.05$. The results are shown in Tables 2 and 3.

Health by gender

We used the SF-36 to test the subjectively assessed quality of health of men and women at the age of 40 and older in individual domains.

For men (N = 937) and women (N = 1055), we used the non-parametric Mann–Whitney U test at $p < 0.05$ to find the differences in average values in the SF-36 domains. The questionnaire is designed for testing the quality of life of people regardless of gender, so we assumed that our case would be the same. The mentioned test proved it – and even the optic check-up using descriptive statistics of individual SF-36 domains did not correctly show the difference (Table 4).

Chart 1 shows that men and women at the age of 40 and older assess the individual domains of the quality of their health very similarly. Men and women are less satisfied with their vitality and general health than the quality of health in other domains. The assessment of the general quality of life is especially interesting because their values are relatively low compared to other domains regarding the quality of health. Other domains do not achieve such low values besides vitality, which seems to be crucial for the assessment of general subjectively assessed health.

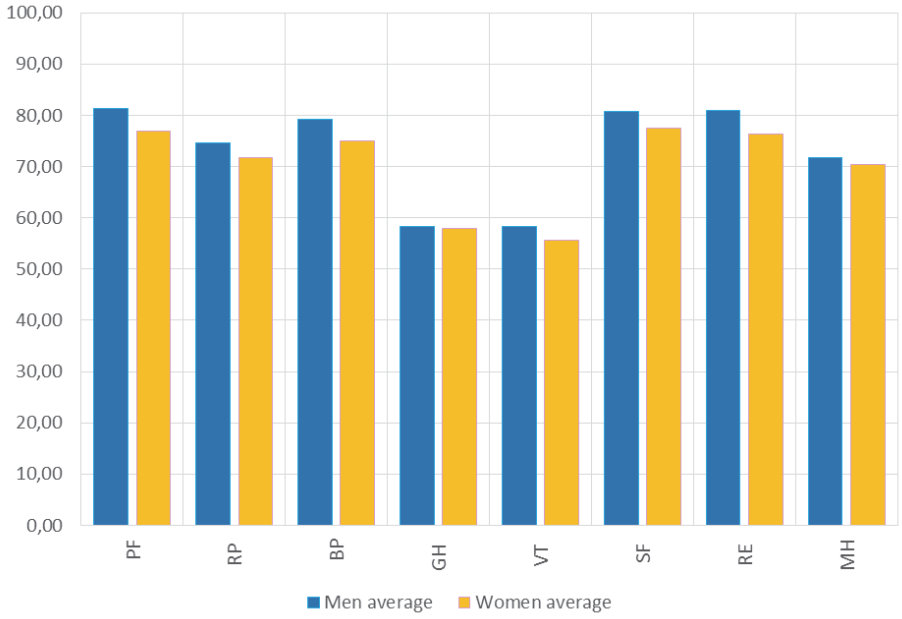
Table 2. The comparison of individual health domains according to the SF-36 (*N* = 1992) – selected sample group of Czech citizens (2016)

Domain	Average	Median	Standard deviation	Skew		Acuteness	
				Value	Standard error	Value	Standard error
PF physical functioning	78.99	90.00	23.595	–1.357	0.055	1.247	0.110
RP role-physical	73.14	100.00	36.453	–1.008	0.055	–0.505	0.110
BP bodily pain	76.94	80.00	24.313	–0.909	0.055	0.040	0.110
GH general health	58.07	60.00	18.980	–0.117	0.055	–0.396	0.110
VT vitality	56.97	60.00	18.074	–0.372	0.055	–0.004	0.110
SF social functioning	78.98	87.50	22.264	–0.951	0.055	0.309	0.110
RE role-emotional	78.50	100.00	34.526	–1.319	0.055	0.235	0.110
MH mental health	71.00	72.00	15.717	–0.695	0.055	0.149	0.110

Table 3. Testing the normal layout in individual domains in the SF-36

	Kolmogorov–Smirnov[a]		
	Statistic	df	*p*
PF physical functioning	0.189	1,992	<0.001
RP role-physical	0.339	1,992	<0.001
BP bodily pain	0.192	1,992	<0.001
GH general health	0.065	1,992	<0.001
VT vitality	0.087	1,992	<0.001
SF social functioning	0.203	1,992	<0.001
RE role-emotional	0.404	1,992	<0.001
MH mental health	0.123	1,992	<0.001

[a] Lilliefors significance correction.



PF Physical Functioning; RP Role-Physical; BP Bodily Pain; GH General Health; VT Vitality; SF Social Functioning; RE Role-Emotional; MH Mental Health

Chart 1. Individual domains regarding health by gender

Table 4. The comparison of individual domains regarding health by gender

Mann–Whitney *U* test of the SF-36 domains by gender								
	PF physical functioning	RP role-physical	BP bodily pain	GH general health	VT vitality	SF social functioning	RE role-emotional	MH mental health
Mann–Whitney *U*	443732.5	477196.0	449444.0	488830.5	459048.0	456076.0	461662.0	477209.5
Wilcoxon W	1000772.5	1034236.0	1006484.0	1045870.5	1016088.0	1013116.0	1018702.0	1034249.5
Z	–3.987	–1.481	–3.594	–0.426	–2.759	–3.082	–3.055	–1.336
p value[a]	**<0.001**	**0.139**	**<0.001**	**0.670**	**0.006**	**0.002**	**0.002**	**0.182**
Cohen's d[b]	0.18	0.07	0.16	0.02	0.12	0.14	0.14	0.06
The assessment of the effect	*no effect*		*no effect*		*no effect*	*no effect*	*no effect*	

[a] statistical significance; [b] relevant significance of the effect size.

Health by age

After analyzing the individual domains by age, the sample group was divided into age groups by 10 years (the same as those that functioned as the criteria in the selection of the sample group). Age groups were further tested using the non-parametric Kruskal–Wallis test at $p < 0.05$ (Table 5).

Table 5. Dimensions by age

Descriptive statistics of the domains by age									
Age categories by 10 years		PF physical functioning	RP role-physical	BP bodily pain	GH general health	VT vitality	SF social functioning	RE role-emotional	MH mental health
40–49 years	*N* Valid	559	559	559	559	559	559	559	559
	Missing	0	0	0	0	0	0	0	0
	Average	**90.55**	**86.14**	**84.66**	**66.46**	**60.77**	**85.26**	**85.51**	**72.49**
	Median	**95**	**100**	**100**	**70**	**60**	**88**	**100**	**76**
	Mode	**100**	**100**	**100**	**75**	**60**	**100**	**100**	**80**
	Standard deviation	14.641	26.608	20.996	17.036	17.453	18.844	28.481	15.532
50–59 years	*N* Valid	487	487	487	487	487	487	487	487
	Missing	0	0	0	0	0	0	0	0
	Average	**85.26**	**82.19**	**82.10**	**62.39**	**59.30**	**83.70**	**83.30**	**72.52**
	Median	**90**	**100**	**90**	**65**	**60**	**88**	**100**	**76**
	Mode	**100**	**100**	**100**	**70**	**50**	**100**	**100**	**84**
	Standard deviation	18.528	31.175	22.097	17.635	17.654	19.894	31.635	15.247
60–69 years	*N* Valid	507	507	507	507	507	507	507	507
	Missing	0	0	0	0	0	0	0	0
	Average	**75.92**	**67.06**	**74.20**	**53.93**	**56.18**	**76.73**	**74.82**	**70.48**
	Median	**85**	**75**	**78**	**55**	**55**	**75**	**100**	**72**
	Mode	**100**	**100**	**100**	**60**	**50**	**100**	**100**	**80**
	Standard deviation	22.254	37.981	23.608	17.396	17.600	22.119	36.167	15.877
70–79 years	*N* Valid	293	293	293	293	293	293	293	293
	Missing	0	0	0	0	0	0	0	0
	Average	**64.62**	**57.42**	**66.36**	**50.15**	**52.42**	**71.25**	**69.85**	**68.53**
	Median	**70**	**50**	**68**	**50**	**50**	**75**	**100**	**72**
	Mode	**80**	**100**	**100**	**50**	**50**	**100**	**100**	**64**
	Standard deviation	25.633	40.044	25.792	18.415	17.564	24.235	38.192	16.037
80 and older	*N* Valid	146	146	146	146	146	146	146	146
	Missing	0	0	0	0	0	0	0	0
	Average	**53.29**	**45.89**	**60.84**	**41.78**	**46.44**	**62.50**	**65.75**	**67.07**
	Median	**55**	**50**	**65**	**40**	**50**	**63**	**100**	**68**
	Mode	5.00[a]	**0**	**100**	**50**	**50**	**63**	**100**	**68**
	Standard deviation	29.246	41.213	25.805	16.154	18.364	24.167	41.972	15.553

[a] Bimodal probability distribution.

Other questionnaires that measure the quality of life depend on age, so we assumed that the SF-36 would show such differences regarding our sample group. Table 6 shows the differences between the subjectively perceived qualities of health in individual domains in the SF-36 regarding the age categories. Most of these differences showed an average or large effect (relevant significance was measured using the Fisher eta^2 coefficient of η^2). A low level of relevant significance was recorded in the domains of Vitality, Role-Emotional and Mental Health. The assessments of health conditions were worse with age. Our analyses showed that the assessments of health in individual domains were closely related to age (based on the application of the SF-36). It is also interesting that this phenomenon was not so present in the domains of Vitality, Role-Emotional and Mental Health.

Table 6. Comparison of individual domains by age

Testing the differences in the SF-36 individual domains by age categories using the non-parametric Kruskal–Wallis test

	PF physical functioning	RP role-physical	BP bodily pain	GH general health	VT vitality	SF social functioning	RE role-emotional	MH mental health
Chi-Square	478.440	245.464	218.063	314.124	109.874	182.683	71.665	30.035
df	4	4	4	4	4	4	4	4
p value[a]	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Fisher eta^2 (η^2)[b]	0.230	0.126	0.103	0.159	0.051	0.094	0.038	0.013
The assessment of the effect	*large effect*	*large effect*	*large effect*	*large effect*	*small effect*	*middle-sized effect*	*small effect*	*small effect*

[a] statistical significance; [b] relevant significance of the effect size.

Health by education

We also carried out the statistical analysis of education categories. There were three education categories in our sample group: basic education, secondary education and university education. This indicator (education) was not representative (Table 7).

Statistically significant differences regarding the quality of life in the domains in the SF-36 by education were found using the non-parametric Kruskal–Wallis test (besides the domain of Mental Health). It seems that the level of the quality of life grows with the level of education (especially in the domain of Physical Functioning). However, the levels of relative significance regarding these differences (found using the Fisher eta^2 coefficient of η^2) are very low, which means that the effect size of statistically significant differences is very small.

Table 7. The comparison of individual domains by education

Testing the differences in the SF-36 individual domains by education categories using the non-parametric Kruskal–Wallis test

	PF physical functioning	RP role-physical	BP bodily pain	GH general health	VT vitality	SF social functioning	RE role-emotional	MH mental health
Chi-Square	96.862	40.214	54.069	56.019	25.173	29.475	7.716	4.879
df	2	2	2	2	2	2	2	2
p value[a]	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.021**	0.087
Fisher eta^2 (η^2)[b]	0.052	0.018	0.027	0.029	0.012	0.014	0.003	0.002
The assessment of the effect	*small effect*	*small effect*	*small effect*	*small effect*	*small effect*	*small effect*	*no effect*	

[a] statistical significance; [b] relative significance of the effect size – here, it is the level of dependence.

The comparison of the results of average values regarding the sample group of people at the age of 40+ to other used standards or norms in the Czech Republic, Great Britain and the USA

The achieved values in individual domains and their comparisons are shown in Chart 2. The comparisons were based on arithmetic average because other average values besides our sample group (2016) were not known.

Only our sample group (2016) provided primary data that enabled the calculations of descriptive statistics and the application of testing criteria that enabled the comparison of individual domains.

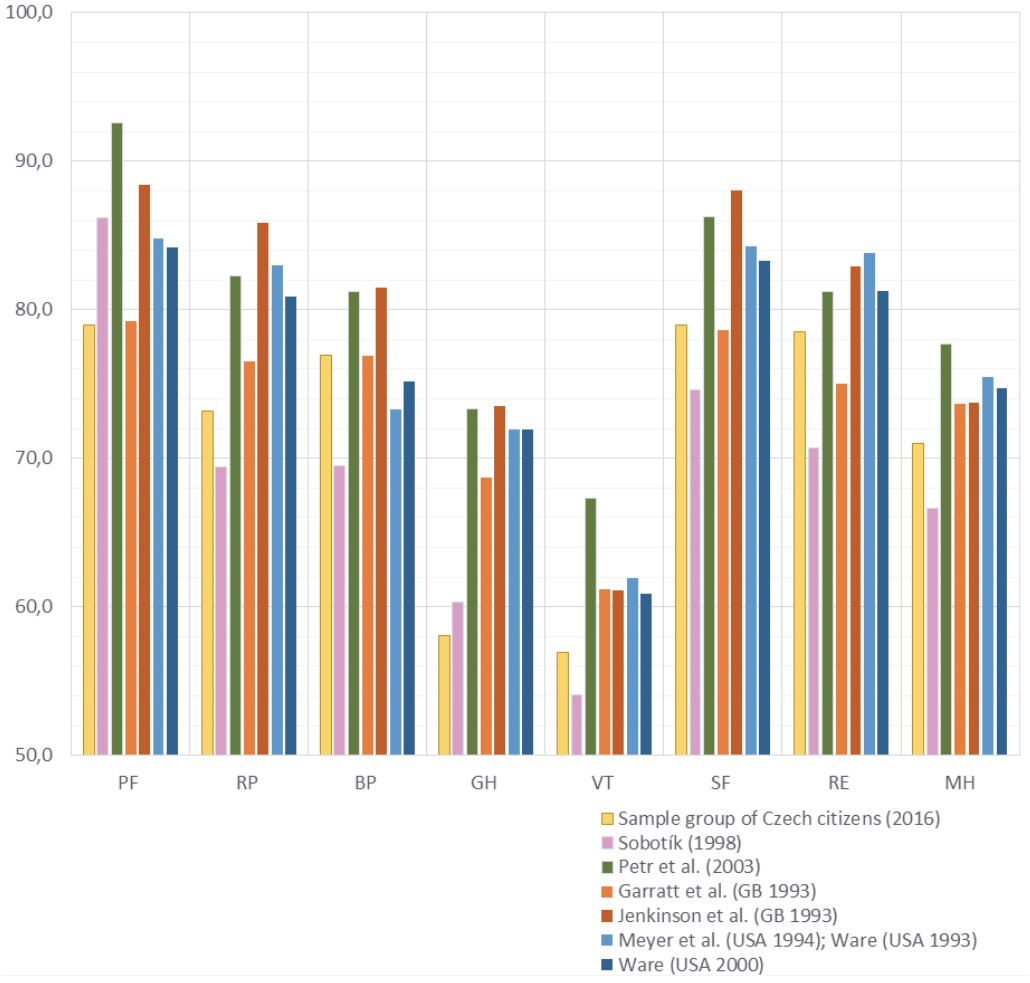
While testing the differences between individual standards in the domains in the SF-36, we used non-parametric and parametric tests. Logically, we should have used only the non-parametric versions because even such a large group (N = 1992) does not offer a normal layout. This is confirmed by the charts regarding individual domains, where the layouts are more similar to exponential curves but do not copy them (it was statistically tested). Non-parametric tests are based on comparisons (the medians of the variables). They are at our tested group's disposal only. Other standards use only average values of individual domains in the SF-36. For this reason, we applied the parametric T-test.

While comparing the standards, it is ideal if there are no statistically significant or relative differences. However, statistically significant differences were almost always found because the groups are qualitatively different and they originate in different time periods. For comparison, it is very important to consider relative significance, which is usually small or none.

Table 8. The comparison of the values in individual health domains regarding our sample group to other available standards (norms)

	PF physical functioning	RP role-physical	BP bodily pain	GH general health	VT vitality	SF social functioning	RE role-emotional	MH mental health	*N*
Sample group of Czech citizens (2016)	**79.0**	**73.1**	**76.9**	**58.1**	**57.0**	**79.0**	**78.5**	**71.0**	1,992[a]
Sobotík (1998)	86.2	69.4	69.5	60.3	54.1	74.6	70.7	66.6	415[b]
Petr et al. (2003)	92.6	82.3	81.2	73.4	67.3	86.3	81.2	77.7	103[c]
Garratt et al. (GB 1993)	79.2	76.5	76.9	68.7	61.2	78.6	75	73.7	542[d]
Jenkinson et al. (GB 1993)	88.4	85.8	81.5	73.5	61.1	88.0	82.9	73.8	9,332[e]
Meyer et al. (USA 1994); Ware (USA 1993)	84.8	83	73.3	71.9	61.9	84.3	83.8	75.5	2,474[f]
Ware (USA 2000)	84.2	80.9	75.2	71.9	60.9	83.3	81.3	74.7	g

[a] representative Czech population at the age of 40+; [b] non-representative Czech population (prevalence of those between 45 and 55 + young; however, standardized); [c] police officers from South Bohemia; [d] general British population; [e] European standard (following the British model; [f] general population of the USA; revised version of the general population of the USA, number not stated).



PF Physical Functioning; RP Role-Physical; BP Bodily Pain; GH General Health; VT Vitality; SF Social Functioning; RE Role-Emotional; MH Mental Health

Chart 2. Comparison of standards and norms of the SF-36 quality of life questionnaire in the Czech Republic, Great Britain and the USA

Table 9. Descriptive statistics of individual domains in the SF-36 questionnaire regarding the sample group of Czech citizens (2016) – average values

	N	Minimum	Maximum	Average	Standard deviation	Median	Mode
PF physical functioning	1,992	0.00	100.00	78.99	23.595	90.0	100.0
RP role-physical	1,992	0.00	100.00	73.14	36.453	100.0	100.0
BP bodily pain	1,992	0.00	100.00	76.94	24.313	80.0	100.0
GH general health	1,992	0.00	100.00	58.07	18.980	60.0	50.0
VT vitality	1,992	0.00	100.00	56.97	18.074	60.0	50.0
SF social functioning	1,992	0.00	100.00	78.98	22.264	87.5	100.0
RE role-emotional	1,992	0.00	100.00	78.50	34.526	100.0	100.0
MH mental health	1,992	0.00	100.00	71.00	15.717	72.0	84.0

Table 10. Testing the differences between the standards in the Sobotík (1997) group and the sample group of Czech citizens (2016)

	PFsob – PF physical functioning	RPsob – RP role-physical	BPsob – BP bodily pain	GHsob – GH general health	VTsob – VT vitality	SFsob – SF social functioning	REsob – RE role-emotional	MHsob – MH mental health
Mediana	90.0	100.0	80.0	60.0	60.0	87.5	100.0	72.0
Z[b]	–6.439	–7.843	–14.618	–6.693	–9.049	–15.72	–8.76	–12.592
p value	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Cohen's d	0.29	0.35	0.66	0.30	0.41	0.70	0.39	0.56
The assessment of the effect	*small effect*	*small effect*	*middle-sized effect*	*small effect*	*small effect*	*middle-sized effect*	*small effect*	*middle-sized effect*
Average value (Sobotík, 1997)	86.2	69.4	69.5	60.3	54.1	74.6	70.7	66.6
Average value (Czech citizens sample group, 2016)	79.0	73.1	76.9	58.1	57.0	79.0	78.5	71.0
t[c]	–13.646	4.582	13.649	–5.244	7.076	8.777	10.080	12.506
p value	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Cohen's d	0.43	0.15	0.43	0.17	0.22	0.28	0.32	0.40
The assessment of the effect	*small effect*	*no effect*	*small effect*	*no effect*	*small effect*	*small effect*	*small effect*	*small effect*

[a] the median is only at our group's disposal (2016); [b] non-parametric Wilcoxon sign test; [c] parametric paired *T*-test.

The statistical tests seem to show that the Sobotík (1998) group of standards is the most similar to our sample group; the *t*-test (which compares the average values in the domains) shows that although there were statistical differences in all SF-36 domains, the relative significance (i.e. effect size) is very small (as proven by the calculation of Cohen's d coefficient). On the contrary, the second Czech group of Petr et al. (2003) showed that statistically, as well as relatively, significant differences are found in four domains (3 times large effect and 1 middle-sized effect). Thus, the differences between the Petr et al. (2003) group and the sample group of Czech citizens (2016) are considerable – surprisingly, the largest of the monitored groups. This is possibly due to the lower respondents' age (the quality of life, especially in physical domains, decreases with age) and their very good physical condition.

From the British group, the Garratt et al. (1993) group of standards was more similar to our group than that of Jenkinson et al. (1993), which should be the representative of the European standards of the SF-36. The Garratt et al. (1993) group showed only one statistically significant difference, which also showed a middle-sized relative significance in the General Health domain. The same domain appears in the Jenkinson et al. (1993) group, but the relative significance here is large – which is possibly due to the mentioned cultural conditions of individual regions/countries. Furthermore, parametric testing of the differences between our group (2016) and the group of Garratt et al. (1993) did not show any statistically significant differences in the domains of Physical Functioning, Bodily Pain and Social Functioning.

Table 11. Testing the differences between the standards in the Petr et al. (2003) group and the sample group of Czech citizens (2016)

	PFpetr – PF physical functioning	RPpetr – RP role-physical	BPpetr – BP bodily pain	GHpetr – GH general health	VTpetr – VT vitality	SFpetr – SF social functioning	REpetr – RE role-emotional	MHpetr – MH mental health
Median[a]	90.0	100.0	80.0	60.0	60.0	87.5	100.0	72.0
Z[b]	–22.69	–3.418	–3.234	–29.097	–20.096	–6.57	–8.76	–13.357
p value	**<0.001**	**0.001**	**0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Cohen's d	1.02	0.15	0.14	1.30	0.90	0.29	0.39	0.60
The assessment of the effect	*large effect*	*no effect*	*no effect*	*large effect*	*large effect*	*small effect*	*small effect*	*middle-sized effect*
Average value (Petr et al., 2003)	92.6	82.3	81.2	73.4	67.3	86.3	81.2	77.7
Average value (Czech citizens sample group, 2016)	79.0	73.1	76.9	58.1	57.0	79.0	78.5	71.0
t[c]	–25.752	–11.212	–7.829	–36.049	–25.520	–14.677	–3.494	–19.014
p value	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Cohen's d	0.82	0.36	0.25	1.14	0.81	0.47	0.11	0.60
The assessment of the effect	*large effect*	*small effect*	*small effect*	*large effect*	*large effect*	*small effect*	*no effect*	*middle-sized effect*

[a] the median is only at our group's disposal (2016); [b] non-parametric Wilcoxon sign test; [c] parametric paired *T*-test.

Table 12. Testing the differences between the standards in the Garratt et al. (1993) group and the sample group of Czech citizens (2016)

	PFgarr – PF physical functioning	RPgarr – RP role-physical	BPgarr – BP bodily pain	GHgarr – GH general health	VTgarr – VT vitality	SFgarr – SF social functioning	REgarr – RE role-emotional	MHgarr – MH mental health
Median[a]	90.0	100.0	80.0	60.0	60.0	87.5	100.0	72.0
Z[b]	–6.46	–3.418	–6.371	–21.71	–8.842	–4.628	–8.76	–2.525
p value	**<0.001**	**0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.012**
Cohen's d	0.29	0.15	0.29	0.97	0.40	0.21	0.39	0.11
The assessment of the effect	*small effect*	*no effect*	*small effect*	*large effect*	*small effect*	*small effect*	*small effect*	*no effect*
Average value (Garratt et al., 1993)	79.2	76.5	76.9	68.7	61.2	78.6	75.0	73.7
Average value (Czech citizens sample group, 2016)	79.0	73.1	76.9	58.1	57.0	79.0	78.5	71.0
t[c]	–0.405	–4.111	0.065	–24.997	–10.457	0.759	4.521	–7.656
p value	**0.686**	**<0.001**	**0.948**	**<0.001**	**<0.001**	**0.448**	**<0.001**	**<0.001**
Cohen's d		0.13		0.79	0.33		0.14	0.24
The assessment of the effect		*no effect*		*middle-sized effect*	*small effect*		*no effect*	*small effect*

[a] the median is only at our group's disposal (2016); [b] non-parametric Wilcoxon sign test; [c] parametric paired *T*-test.

The health profile of the Czech Republic published in 2017 (OECD/European Observatory on Health Systems and Policies, 2017) points out the prolonged average life expectancy by almost four years (to 78.7 years) between 2000 and 2015. Although it is a noticeable increase, this value is still behind the European average. The lasting difference between genders is also noticeable. Regarding this fact, the statistics that show that Czech women at the age of 65 will live 44% of the remaining years of their life without health problems is also interesting. Men can expect this at 50%. For completeness, we add that the average life expectancy in men is 75.7 years and 81.6 years in women. The most frequent causes of death are cardiovascular diseases, lung cancer and colorectal cancer. Regarding cardiovascular diseases, it is necessary to emphasize that the age standard of mortality in the Czech Republic is 60% higher than the EU average.

Table 13. Testing the differences between the standards in the Jenkinson et al. (1993) group and the sample group of Czech citizens (2016)

	PFjenk – PF physical functioning	RPjenk – RP role-physical	BPjenk – BP bodily pain	GHjenk – GH general health	VTjenk – VT vitality	SFjenk – SF social functioning	REjenk – RE role-emotional	MHjenk – MH mental health
Median[a]	90.0	100.0	80.0	60.0	60.0	87.5	100.0	72.0
Z[b]	–11.382	–3.418	–3.275	–29.097	–8.842	–18.369	–8.760	–2.525
p value	**<0.001**	**0.001**	**0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.012**
Cohen's d	0.51	0.15	0.15	1.30	0.40	0.82	0.39	0.11
The assessment of the effect	*middle-sized effect*	*no effect*	*no effect*	*large effect*	*small effect*	*large effect*	*small effect*	*no effect*
Average value (Jenkins et al., 1993)	79.2	76.5	76.9	68.7	61.2	78.6	75.0	73.7
Average value (Czech citizens sample group, 2016)	79.0	73.1	76.9	58.1	57.0	79.0	78.5	71.0
t[c]	–17.808	–15.497	–8.380	–36.284	–10.210	–18.085	–5.691	–7.940
p value	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Cohen's d	0.56	0.49	0.27	1.15	0.32	0.57	0.18	0.25
The assessment of the effect	*middle-sized effect*	*small effect*	*small effect*	*large effect*	*small effect*	*middle-sized effect*	*no effect*	*small effect*

[a] the median is only at our group's disposal (2016); [b] non-parametric Wilcoxon sign test; [c] parametric paired *T*-test.

Table 14. The norms for individual domains of the SF-36 questionnaire for the Czech environment and age over 40 years in percentage (the sample group of Czech citizens, *N* = 1992, 2016)

	PF physical functioning	RP role-physical	BP bodily pain	GH general health	VT vitality	SF social functioning	RE role-emotional	MH mental health
10	45.00	0.00	45.00	35.00	30.00	50.00	0.00	48.00
20	60.00	25.00	55.00	40.00	40.00	62.50	33.33	56.00
25	70.00	50.00	57.50	45.00	45.00	62.50	66.67	60.00
30	75.00	50.00	67.50	50.00	50.00	75.00	66.67	64.00
40	80.00	75.00	77.50	55.00	55.00	75.00	100.00	68.00
50	90.00	100.00	80.00	60.00	60.00	87.50	100.00	72.00
60	90.00	100.00	90.00	65.00	60.00	87.50	100.00	76.00
70	95.00	100.00	100.00	70.00	70.00	100.00	100.00	80.00
75	100.00	100.00	100.00	70.00	70.00	100.00	100.00	84.00
80	100.00	100.00	100.00	75.00	72.00	100.00	100.00	84.00
90	100.00	100.00	100.00	85.00	80.00	100.00	100.00	88.00

The norms are valid for the adult population of the Czech Republic over 40 years. It is necessary to take other age ranges into consideration during the comparison.

Czech citizens at the age of 40 and older assessed Social Functioning the best. Their quality of life regarding Role-Emotional and Physical Functioning is also on a high level (a low level of Role-Emotional). On the contrary, their assessment of Vitality and General Health was worse. It is interesting that although individual domains were assessed relatively well, the quality of life regarding General Health was assessed as a little better than average. It was similar regarding Vitality.

The assessment of Physical Functioning was associated with Role-Physical, Bodily Pain, Social Functioning and General Health. We did not find the connection to Vitality, Role-Emotional or Mental Health.

Role-Physical correlated with Physical Functioning, Role-Emotional and Social Functioning. This domain was also significantly associated with Bodily Pain, Vitality and General Health. We did not find the connection to Mental Health.

Bodily Pain was associated with Social Functioning, Vitality, General Health and Physical Functioning. We did not find the connection to Role-Emotional or Mental Health.

General Health correlated with Vitality, Social Functioning, Physical Functioning, Role-Physical and Bodily Pain. We did not find the connection to Role-Emotional or Mental Health.

Vitality was associated with Mental Health, Social Functioning, General Health, Role-Physical and Bodily Pain. We did not find the connection to Role-Emotional or Physical Functioning.

Social Functioning was associated with Bodily Pain, Role-Physical, Role-Emotional, Mental Health, Physical Functioning, General Health and Mental Health. We can say that Social Functioning was associated with all domains.

Role-Emotional was associated with Role-Physical and Social Functioning. We did not find a connection to other domains.

Mental Health was associated with Vitality and Social Functioning. We did not find a connection to other domains.

Differences between men and women in the comparison of the domains were minimal.

Regarding age, we can say that the quality of life decreases with age. The least noticeable differences regarding the age categories were found in Mental Health and Vitality. The quality of life in these domains also decreases with age, although slightly. Regarding education, it seems that the quality of life increases with the level of education (especially regarding physical domains). However, the levels of relative significance regarding these differences are very low, which means that the effects of the found statistically significant differences are very small.

In the Czech Republic, the following authors have tried to create the standards of the SF-36 questionnaire. In 1998, a paper by Z. Sobotík on first experiences with the preliminary Czech version of the SF-36 was published. Petr et al. published a paper on regional standards in 2003.

The group of standards by Sobotík (1998) is a non-representative sample of 415 people who had been randomly selected from the general population. Most representatives in this group were 15–24 and 45–54 years old, although all age categories were included. This was one of the reasons the sample group was standardized by age structure in 1995. However, it seems that it is very similar to the contemporary group (2016).

The group of standards by Petr et al. (2003) was based on a group of 103 representatives (police officers from South Bohemia) but the paper did not describe it in detail. It seems that it included exceptionally able-bodied younger individuals who highly assessed the level of their quality of life. Despite the fact that it appeared to be a qualitatively different group, it fitted into the compared standards, although its values were often very overrated.

Other compared groups were from Great Britain – Garratt et al. (1993) and Jenkinson et al. (1993).

The group of standards by Garratt et al. (1993) included 542 respondents. They had been randomly selected from the Aberdeen district in Scotland. Although the group was based on region and culture, it seems to be the most similar to our group.

The second group of standards by Jenkinson et al. (1993) included 9,332 people who had been randomly selected from the health service registers in four neighbouring shires in Great Britain (Berkshire, Buckinghamshire, Northamptonshire and Oxfordshire). This should be the European standard. Compared to the tested sample group, the group by Jenkinson et al. (1993) is too deviated in some domains, which corresponds to the original appeal of the authors that there should be regional standards that would correspond with cultural levels.

The last two groups are from the USA, which is also the birthplace of this questionnaire. Although the similarity of the Anglo-Saxon cultures (the USA and Great Britain) is apparent, we need to be careful when comparing them to the Czech environment.

From the point of view of the standards of the SF-36 questionnaire for the Czech Republic, our sample group meets the requirements the best. For this purpose, Table 14 shows the norms for individual domains in percentage.

Conclusions

We must realize that the incidence of chronic diseases is associated with the older population because older people suffer from these diseases for many years. Their clinical development and a person's health condition affect the quality of life in all domains.

The sole effort for symptomatological treatment without considering influential risk factors and the total quality of life is not sufficient for efficient prevention. Measuring the quality of life is one element that can significantly help the effective establishment of individualized and preventative care. It also enables uncovering of the indicators that can be effectively used for motivating a person, and a tool for the assessment of the impacts of interventions. The Short Form – 36 (SF-36) questionnaire is a tool managed by the RAND Corporation non-profit organization. It serves for the subjective assessment of health condition (the quality of life). Academic papers lack information about the validation of the Czech version. The Czech version of the questionnaire was however validated in the course of our research as primary data became available that enabled calculations of descriptive statistics and applications of testing criteria which enabled the comparison of individual domains.

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Conflict of interests
The authors have no conflict of interests to declare.

Kvalita zdraví u české populace 40+ dle dotazníku Short Form – 36 (SF-36)

Souhrn
Kardiovaskulární choroby patří k hlavním příčinám úmrtí nejen v mnoha vyspělých zemích, ale i v zemích rozvojových. Podpora zdraví a preventivní činnosti mají ve zdravotnictví významné místo a důležitou roli v ní hraje ošetřovatelství. Hlavním záměrem bylo zmapovat současný stav v oblasti prevence kardiovaskulárních onemocnění z hlediska občanů ve věku 40 let a více.

Cílem výzkumného šetření bylo zjistit, jaká je úroveň prevence kardiovaskulárních onemocnění, v čem spočívají největší rezervy z pohledu občanů a jaké jsou představy o zvýšení účinnosti této prevence z pohledu této cílové skupiny. Cílem studie bylo ověřit českou verzi dotazníku zkrácené verze – 36 (SF-36).

Zvolena byla kvantitativní metodologie za použití sady dotazníků, kde část tvořil standardizovaný dotazník RAND 36 – Item Health Survey (SF-36), který je používán ke zjišťování kvality života v souvislosti se zdravím. Česká verze dotazníku byla v roce 2016 ověřována na vzorku 1992 občanů ve věku 40 a více let.

Nejlépe je hodnocena občany ČR ve věku 40 a více let dimenze společenského fungování, vysoká je rovněž kvalita jejich života v oblasti emoční (malá míra omezení pro emoční problémy) a fyzické činnosti. Naopak jako horší je hodnocena vitalita (energie/únava) a celkové zdraví. Rozdíly mezi muži a ženami v porovnání jednotlivých dimenzí zdraví jsou minimální. S věkem kvalita života v této oblasti klesá.

Česká verze dotazníku Short Form – 36 je v České republice hojně využívána. Validizován byl dotazník teprve u našeho souboru, neboť výzkum byl schopen poskytnout taková primární data, na jejichž základě bylo možné provést statistické výpočty a zároveň aplikovat příslušná testovací kritéria tak, aby bylo možné vytvořit normy tohoto dotazníku aplikovatelné na české podmínky.

Klíčová slova: kvalita života; měřicí nástroj; prevence kardiovaskulárního onemocnění; reliabilita; validita

References

1. Garratt AM, Ruta DA, Abdalla MI, Buckingham JK, Russell IT (1993). The SF36 health survey questionnaire: an outcome measure suitable for routine use within the NHS? BMJ 306: 1440–1444. DOI: 10.1136/bmj.306.6890.1440.
2. Jenkinson C, Coulter A, Wright L (1993). Short form (SF36) health survey questionnaire: normative data for adults of working age. BMJ 306: 1437–1440. DOI: 10.1136/bmj.306.6890.1437.
3. Meyer KB, Espindle DM, DeGiacomo JM, Jenuleson CJ, Kurtin PS, Davies AR (1994). Monitoring dialysis patients' health status. Am J Kidney Dis 24(2): 267–279. DOI: 10.1016/s0272-6386(12)80192-2.
4. OECD / European Observatory on Health Systems and Policies (2017). Česká republika: zdravotní profil země 2017, State of Health in the EU, OECD Publishing, Paris/European Observatory on Health Systems and Policies. [online] [cit. 2019-01-22]. Dostupné z: russels.http://dx.doi.org/10.1787/9789264285125-cs
5. Petr P, Veselý M, Dolista J, Kalová H (2003). Kvalita života příslušníků PČR v Jihočeském kraji. Kontakt 5(4): 216–223.
6. Sigmundová D, Sigmund E (2012). Statistická a věcná významnost a použití dat o pohybové aktivitě. Tělesná kultura 35(1): 55–72. DOI: 10.5507/tk.2012.004.
7. Sobotík Z (1998). Zkušenosti s použitím předběžné české verze amerického dotazníku o zdraví (SF-36). Zdravotnictví v České republice 1(1–2): 50–54.
8. Tóthová V, Chloubová I, Prokešová R (Eds) (2019). Význam ošetřovatelství v preventivní kardiologii. Praha: Grada.
9. Ware JE (1993). SF-36 Health Survey Manual and Interpretation Guide. Boston, MA: Nimrod Press.
10. Ware JE, Jr. (2000). SF-36 health survey update. Spine 25(24): 3130–3139.
11. Ware JE, Jr., Sherbourne CD (1992). The MOS 36-Item Short-Form Health Survey: I. Conceptual framework and item selection. Med Care 30(6): 473–483.