Subjective and objective indicators in the research on health status

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ABSTRACT

Several research works in the related international literature on sociology and health sciences deal with the state of health in one selected population. In these researches, the chosen sample is often connected with special jobs, especially with healthcare professionals and their working conditions. These studies predominantly examine the self-rated subjective health status using questionnaires. There are others that assess the state of health based not only on self-rated subjective indicators, but also using objective data gained by measuring. Considering the international experiences, we chose a special population in our research – healthcare professionals working in an institute for chronically ill psychiatric patients. Our choice was influenced by the fact that we wanted to include their unique working conditions when exploring and assessing their health status. Moreover, our approach was to assess the objective state of health alongside the subjective factors, as our hypothesis was that the majority of the indicators presumably coincided. The data were collected with the help of three questionnaires and some indicators of the objective health statuses were measured. The findings were processed using the SPSS 17.0 mathematical-statistical software package. Following the descriptive statistics, we applied hierarchic cluster-analysis based on results of the WHOQOLD BREF26 life-quality questionnaire, the WHO WBI-5 Well Being Index, and on the body composition analysis. The results show the objective and subjective health status of population and the factors that influenced it; the working conditions, and the interpersonal contacts in the workplace. The conclusion was that in the examined population the subjective and objective health status doesn't coincide. **Key words**: SUBJECTIVE HEALTH STATUS, OBJECTIVE HEALTH STATUS, CLUSTERCHANGERS.

INTRODUCTION

Research papers regarding heath status are all in agreement with the fact that health is influenced by several factors. At the same time, the concept of health itself entails not only physical but also mental health. Researchers have developed and applied quite a number of methods recently to assess the individual's subjective state of health – these include questionnaires and tests validated by the World Health Organization (WHO) or other international organizations. Scales, anthropometer, height gauge, tape measure and recently body analyzer have been used to assess the individual's objective health conditions. Questionnaires and tests are based on self-rating therefore they are subjective, while measuring tools provide objective data about the individual.

Most of the international and Hungarian literature regarding health status explore the subjective indicators based on self-rating therefore there is comparatively less emphasis on research papers relying on objective, measured data. This is applicable for both the general and special (e.g. health service employees) populations. Research papers on the subjective state of health present among others the attributes of self-assessed health, satisfaction with life, social support and well-being in the actual population. Furthermore they also present the individual's nutritional condition based on the ratio of the self-estimated height and weight. On the other hand objective measuring determines the nutritional condition of the examined individuals with the help of certain instruments. Hereafter, the Hungarian and international literature on subjective and objective analysis shall be non-exhaustively surveyed in a thematic manner.

In Hungary, the research – that explores the health status based on subjective data – with the biggest number of items (N=12.000) is based on the questionnaire called Hungarostudy. The survey has been done every seven, and every three years since 1988 (1995, 2002, 2005/2006, 2013). The data retrieved from individual tests and the comparison of the results of the questionnaires mentioned above enable us to explore the most significant health concerns, furthermore they give insight into the frequency of the issues and the bio-psychic-social background factors. The health questionnaires provide significant information regarding the self-rated health and the behavior towards health and sickness – this kind of information could not be obtained from official records, only by personally interviewing the population via questionnaires.

Based on 2002's Hungarostudy, 16.5 % of the interviewed people deemed their health status poor or very poor, 39.2 % of them were satisfied while according to 43.8 % their state of health was good or excellent. (Réthelyi, 2006) Looking at the genders of interviewees, Csoboth's (2006/a) research shows that 6 % of women and 8.9 % of men considered their health condition excellent; 5.3 % of women and 3.9 % of men thought their health was very poor. The subjective assessment of health for women is influenced by educational level, professional and marital status to a much higher extent than for men (Csoboth, 2006/a). As far as the time of life the older interviewee consider their health poorer: 7.1 % of 31-40 year olds, 29.6 % of 41-50 year olds and 46.2% of 51-60 year olds thought of themselves as relatively unhealthy (Kovács-Jeszenszky, 2006.).

The research done among health service employees who work with the specially or seriously ill showed that there are significant differences regarding the self-reported health between doctors and uncertified orderlies, (p=0,006) as well as between the certified orderlies and the uncertified orderlies (p=0,006). This data seems to prove that the educational level has an effect on the self when assessing the own health status (Hegedűs-Riskó, 2006). Moreover, the financial situation also has a profound effect (Kopp-Skrabski, 2006/a.). It is interesting to note that those who regularly exercise (one or more times per week) considered their health condition significantly better than those that did not do any sport related activities (p<001). Therefore, after

filtering out other factors (e.g. age, gender), sport remains the only independent factor when rating one's own health (p<0.01) (Gémes, 2006).

A Swedish paper studied the effects of the socioeconomic, working conditions, and lifestyle factors on the self-rated health among 18-79 year olds. The strength of the study is the huge number of interviewees and the many factors arising from the context. The data were retrieved in spring 2000 and layered random sampling was applied. Altogether 46.646 people answered the questionnaire with a total response rate of 65 %. The strongest relation found by the study was between the poor state of health and the social situation – financial difficulties of disadvantaged people, lack of social support and low-level employment. The next big factors were age, gender, ethnicity, and lifestyle conditions. Furthermore the study also determined that the lack of physical activities, the thinness and the obesity have a negative effect on the self-rated health as well. Those who are dissatisfied with their job or live under fear of losing their job also reported poor health status. This conclusion was reinforced by the data according to which people that are dissatisfied with their job are 7 times more likely to evaluate their state of health bad than those who have no such feelings towards their job.

The author of the paper also used other studies to support the strong relationship between the health status and the working conditions as well as the financial situations. For instance, earlier examinations done by Karasek-Theorell (1990), Marmot et al. (1997) verified that the high expectations on the job, together with low supervision of the work done, are detrimental to a more realistic self-assessment of health (Karasek R., Theorell T, (1990), Marmot MG, Bosma H, et all (1997). The economic factors such as financial difficulties and uncertainties also have an effect on the state of health (Yngwe MA, Diderichsen F at all, (2001), Ecob R, Smith GDm (1999), Ferrie JE, Shipley MJ et al., (2003). This is also supported by the data from the author of the Swedish paper; the interviewees that have had problems with paying the bills on time are twice as likely to regard their health poor, than those who have had no such financial issues in their everyday lives. According to the study, 7 % of men and 9 % of women reported poor state of health. In this study there seems to be no statistically significant relationship between the self-assessment of one's health with the educational level for women. On the other hand it is true for both genders that as they age, they deem their own health rating worse and worse, as already outlined in 2002's Hungarostudy (A. Molarius, Kenneth B et al, 2006).

A Danish study examined the self-perceived health among employees in special jobs and working conditions. The authors (Weyers et al., 2006) choose the health sector as according to them it is a more and more developing part of the economy in developed societies. They start from– referring to other researches – that the work of healthcare professionals do very much differ from other occupations as they are in relatively needy working conditions and under huge physical and psychic-social workload (Borrill CS, Wall TD, et al., (1998), Dewe PJ. (1987), Gray-Toft P, Anderson JG. (1981). According to other researchers, further difficulties include irregular work hours, lack of promotional prospects and the social-emotional anxiety as well as the quality and quantity of interactions with colleagues and the ills. (Bischoff-Wanner C. (1992), Penson RT, Dignan FL, et al., (2000), van Dierendonck D, Schaufeli WB, et al., (2001). Healthcare work entails more and more time spent on sick leave (Bird J.(1995), worse physical and mental health, (Bakker AB, Killmer CH, et al., (2000), Cheng Y, Kawachi I, et al., (2000), Munro L, Rodwell J, et al., (1998), van Vegchel N, de Jonge J, et al., (2001), van Vegchel N, de Jonge J, et al., (2002), and a high rate of career change (Hasselhorn HM, Tackenberg P, et al., (2003).

The representative sample of the above mentioned Danish paper was populated with orderlies and assistants from North Jutland. The interviewees worked in the somatic departments and psychiatry of hospitals and in basic health care (e.g. nursing home, communal nursing). Altogether 2424 questionnaires were sent out

resulting in the total response rate of 67.7 %. The study included full-time nurses (N=367). Measuring the self-perceived health was done using the SF-36 questionnaire (Ware JE, SnowKK, et al., (1997) which not only measured the general health but the vitality and the mental well-being as well. The paper also studied the disproportionateness of the work effort and the rewards or recognition and if this can contribute to the poor state of health. The effects of high commitment towards the work was also under examination. Physical health was determined by the presence of stomach, cardiovascular and muscular complaints. Based on the results, it can be concluded that the nurses with high commitment towards their job are twice as likely to suffer from the lack of mental health. This effect was doubled among the nurses for whom the workload and the recognition were not in balance, but were committed to their jobs regardless (Weyers S, Peter R et. al., 2006).

Besides the already outlined empiric research papers, it is worthy to note the recently published literature-analysis done by Mavaddat and her peers. The authors looked for research papers online to expose the relationship between the self-rated health with the fatal and non-fatal diseases. The following factors had to be met for a paper to be analyzed: examined people had to be adults, there could only be one direct question to determine the self-rated health condition and the research had to be followed up. The quality of the papers was evaluated based on the Newcastle-Ottawa scale (Wells GA, Shea B. et al, 2007) so that the results could be compared. The analysis contained 20 papers after all, 13 examined European, and 5 examined American while 2 examined Asian populations. The number of the members of the examined populations varied from 234 to 689.710, tracking time was 2.3-23 years and most of the research was followed up more than 5 years.

Out of the papers that met the criteria, they emphasized the ones that enabled a differentiated interpretation of the relationship between the subjective (based on self-rating) and the objective (based on actual measured data) approaches. One of the populations chosen constituted of persons with cardiovascular or ischemic heart disease. Idler et. al. (2004) found that analyzing the self-rating health confidently predicts mortality for those whose circulatory disease have already been identified versus for those whose condition has not yet been diagnosed.

This is also supported by a paper that examined self-rating heath in populations of people suffering from special diseases. This unique American study – done by the National Health Interview with 20 year following up – shed light on the fact that the self-rating health can forecast death caused by diabetes, infectious diseases, respiratory diseases and coronary artery disease as well as cancer (Benyamin, 2004). Another 2013 study – using data collected from middle-aged American adults (N=4770) – found that the self-rating health can foresee certain chronic diseases including coronary artery disease, stroke, diabetes, pulmonary disease and articular troubles (Latham K., Peek CW, 2013 cited: Mavaddat, N, Richard A.P. et. al., (2014).

The literature analyst Mavaddat et. al. determined that in the populations where cardiovascular disease has been diagnosed and supervised there was a significant relationship between the self-rated health and death by cardiovascular disease (Mavaddat, N, Richard A.P. et al., 2014).

One of the examined papers – written by Van der Linde et. al – found the strongest connection between the self-rated status and the non-lethal cardiovascular incidents. This paper is considered to be the most reliable one due to the huge number of the examined population, its heterogeneity and its more than 10 years of tracking (Van der Linde, 2013, cited: Mavaddat, N, Richard A.P. et al., 2014).

The results of the papers and works mentioned so far all rest upon subjective data. All research works used questionnaires and morbidity statistics to explore the individual's health indicators.

The objective research approach examines the nutritional condition of the individual. The ratio of non-contagious diseases – including the leading obesity – has been increasing resulting in the emergence of a 'global burden of disease' as it is referred to in international literature. The obesity epidemic characteristic of recent decades is the collective result of globalization, urbanization, excess of food, lack of self-control in eating habits as well as inactive lifestyle. Obesity is a separate category in the International Classification of Diseases (ICD) reinforcing the weight of the issue. According to the relevant literature, obesity, the prevention of its chronic condition and reduction of frequency can be regulated by professionals who deal with prevention. Consequently, the regulations regarding obesity indicate extra tasks not only for healthcare and eating culture but for economic, legal and commercial sectors as well (Józan, 2013).

Obesity and its extent is determined by the globally accepted Body Mass Index=BMI. The index is defined as the individual's body mass divided by the square of their height in meters, with the value universally being given in units of kg/m^2. This index can be calculated based on data provided by the individuals (subjectively) or on actual measured data (objectively). Most of the subjective research works categorize individuals into 'thin', 'normal', 'overweight' and 'highly obese' categories by BMI. Furthermore, the waist-hip ratio is also applied which is the ratio of the circumference of the waist to that of the hips – a reliable method to measure abdominal obesity. The values of this indicator are retrieved from measured data. The research works analyzed below show which ones are supported by actual measured data. Thus it is apparent that the research works that examine the nutritional condition (mainly obesity) using measured data, often apply combined approaches therefore the data retrieved from the self-rating health is also utilized in the final overall conclusions.

The *Health at a Glance: Europe 2012* publication provides an overall look at the obesity in the European population using 2010 data from 27 EU member states. The results were calculated based on self-rated health in 21 states while in the remaining 6 states instrumental measurements were used (scales, anthropometer). According to the study, 16.6 % of Europeans are obese, the lowest rate is in Romania (7.9%) while Hungary is leading in this respect (28.5%). The Hungarian data originated from instrumental measurements (scales, anthropometer) done by the National Nutritional Condition Study (2009). Based on the representative sample with 1165 individuals, it can be concluded that the two-thirds of the Hungarian population are overweight or highly obese. Looking at the genders, approximately 30% of women and 26% of men are obese. Abdominal obesity is more characteristic for women and the ratio is ever-increasing as the individual ages. It is important to note however that the Romanian data are based on self-evaluation while the values of the Hungarian population were assessed using instruments (cited, Józan, 2013).

Roskam Albert-Jan R. (2010) et al. found – via research done in 19 countries – that the social determination of obesity prevails for the women population. Regarding the genders in the EU, there is not much difference between the number of obese men (16.6%) and women (16.5%) (cited: Józan, 2013).

According to Bobak's study – based on the MONICA WHO project (Monitoring trends and determinants in Cardiovascular disease) – results from Hungarian women do not vary from that of the Western-European women with regards to waist-hip ratio (Bobak, 2002 cited: Csoboth, 2006/a).

Szumska's research – based on the subjective 2002 Hungarostudy done by Kopp et al. – shows that more women have 'normal' weight (45.2%) than men (39.8%). Men lead in the overweight and highly obese categories; however, moderate obesity is more characteristic of women. Among 18-44 year olds, more men are obese than women (13.4% and 9.5%, respectively), among 45-64 year olds the ratio is nearly the same

in terms of obesity (men: 25.3%; women: 26.7%). This study also found significant relationship between obesity and age. Further connection can be discovered between the size of the habitation and obesity (likely the smaller the habitation, the bigger the tendency towards obesity), as well as between the individual's social conditions and obesity. Obesity played an important role for both genders when conducting evaluating own state of health, obese people consider their health to be worse compared to how people with 'normal' weight think of themselves. (Szumska, 2006).

The Hungarostudy 2013 (n=1945) survey based on self-rating health concluded that 3.6% of the interviewees were underfed, 43.7% had normal weight, 33% of them were overweight and 19.7% were highly obese. Among the overweight individuals, we can still see significantly more men. The Hungarostudy 2013 survey confirmed the outcome of the Hungarostudy 2002 according to which obesity is more and more present as individuals get older. The Hungarostudy 2013 showed that middle-aged (45-64 year olds) have significantly bigger chances of getting obese (p<0001), than the younger generations. Moreover, correlating the chances of obesity with certain background factors, it can be seen that being in a partner relationship also increases the chances of obesity (p=0.04). Low-level education and better financial conditions also have a profound effect on obesity (p<0.05). According to the results received from the one-aspect variant analysis, nutritional condition is in significant correlation (p<0.001) with the well-beeing, therefore as we gain excess weight, our subjective feel of well-being gets worse and worse (Túry et al., 2013).

Boros et al. conducted a research in fall 2013 among adults in North-Western Hungary. They used the Weight History questionnaire to follow up the weight change in a certain amount of time, and to control weight loss as well as the strategies of weight maintenance. Altogether 184 men and 236 women were interviewed. One of the questions was: 'How do you think of yourself in terms of nutrition'? The answer that could be chosen were the categories established by the BMI. Among women, the number of individuals classified as overweight and those that deemed themselves as such were nearly the same, while only one-third of overweight men thought of themselves as such. If we take aging into account, it can be stated based on this study that women gain weight more increased, than men (Boros et al., 2013).

A study conducted in 5 cities in China served to shed light on the relationship between the objective and subjective state of health. Data gathered from 16.074 individuals were used to perform statistical analysis – 8.388 women (52.18%), and 7.686 men (47.82%). 3.151 individuals provided objective data (blood sample) – 1.749 women (55.51%), and 1.402 men (44.49%). Only the data from these people were used when presenting the relationship between the subjective and objective health condition. According to the results of the study, people with bad laboratory indicators deemed their health worse than those with no such issues. This tendency was even more striking for people with cerebral and cardiovascular diseases, impaired vision and mental health issues. Moreover it turned out that the objective health indicators are closely engaged with demographic characteristics, anamnesis, lifestyle, stress at home and work. Stress at home and work, mental problems, and the inadequate interpersonal relationships are the factors that can be highlighted as cause of individuals considering their health worse. As shown by the logistic regression analysis those who think their health is poor are more likely to get sick. This effect can be influenced by gender, age, region, marital status, educational level, current job, family income, smoking, drinking, the frequency of sport activities and chronic disorders (Wu Shunquan, et al, 2013).

MATERIAL AND METHODS

Our own research was conducted exploring the characteristics of subjective and objective health rating. We measured 131 people. To measure subjective indicators, we used the WHO WBI 5, the WHO BREF 26 and

a self-made – tested in 2010 on a similar sample – questionnaire. The objective data were retrieved using the Inbody 720 Body Composition Analyzer. The data was processed using the SPSS 17.0 mathematical-statistical software package. The answers gathered by the questionnaire on individual living-conditions were analyzed with the help of descriptive statistics (frequency, relative frequency). Following the descriptive statistics, we applied hierarchic cluster-analysis based on results of the WHOQOLD BREF26 life-quality questionnaire, the WHO WBI-5 Well Being Index, and on the body composition analysis. The individual groups were set up by the Ward process. Hereafter we will review the health indicators of our population examined by both subjective and objective instruments.

RESULTS

As seen so far, some of the research used subjective data, while some also used objective, measured values to evaluate the health conditions of the examined populations. Among the latter, only two researchers found relation between both subjective and objective data (Mavaddat, N, Richard A.P. et al., (2014), Wu Shunquan, et al, (2013). None of them however addressed whether or not the subjective self-rated health coincides with the objective indicators based on actual measured data. One of our goals was to answere this question. Data gathering was conducted in 2012 among healthcare employees in a Hungarian psychiatric institute. Evaluation of the examined population relied on questionnaires and instruments so consisting of both self-rated, and actual, measured data. After having compared the subjective and objective information, the following figures show our results.

The first figure shows the subjective and objective clusters, created by mathematical statistical methods. The names of the subjective clusters are as follows:
1. Fine and satisfied
2. Fine but unsatisfied
3. Unwell and unsatisfied

The names of the objective clusters are as follows:
A. Healthy
B. Health-protecting
C. Health-destroying

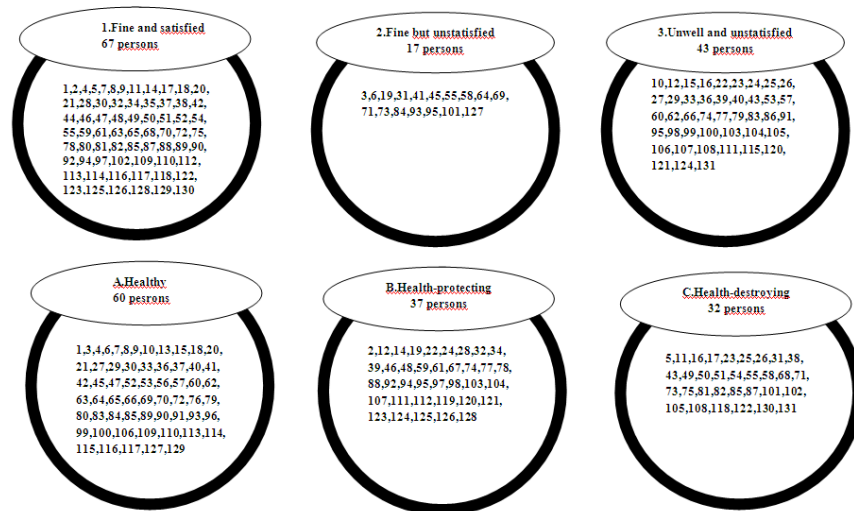The circles below show the serial numbers of the members of the 6 different clusters.

1. Fine and satisfied
67 persons

1,2,4,5,7,8,9,11,14,17,18,20,
21,28,30,32,34,35,37,38,42,
44,46,47,48,49,50,51,52,54,
55,59,61,63,65,68,70,72,75,
78,80,81,82,85,87,88,89,90,
92,94,97,102,109,110,112,
113,114,116,117,118,122,
123,125,126,128,129,130

2. Fine but unstatisfied
17 persons

3,6,19,31,41,45,55,58,64,69,
71,73,84,93,95,101,127

3. Unwell and unstatisfied
43 persons

10,12,15,16,22,23,24,25,26,
27,29,33,36,39,40,43,53,57,
60,62,66,74,77,79,83,86,91,
95,98,99,100,103,104,105,
106,107,108,111,115,120,
121,124,131

A. Healthy
60 persons

1,3,4,6,7,8,9,10,13,15,18,20,
21,27,29,30,33,36,37,40,41,
42,45,47,52,53,56,57,60,62,
63,64,65,66,69,70,72,76,79,
80,83,84,85,89,90,91,93,96,
99,100,106,109,110,113,114,
115,116,117,127,129

B. Health-protecting
37 persons

2,12,14,19,22,24,28,32,34,
39,46,48,59,61,67,74,77,78,
88,92,94,95,97,98,103,104,
107,111,112,119,120,121,
123,124,125,126,128

C. Health-destroying
32 persons

5,11,16,17,23,25,26,31,38,
43,49,50,51,54,55,58,68,71,
73,75,81,82,85,87,101,102,
105,108,118,122,130,131

Figure 1. Subjective and objective clusters

The second figure represents the cluster-changers.

1. Fine and satisfied
67 persons

1,2,4,5,7,8,9,11,14,17,18,20,
21,28,30,32,34,35,37,38,42,
44,46,47,48,49,50,51,52,54,
55,59,61,63,65,68,70,72,75,
78,80,81,82,85,87,88,89,90,
92,94,97,102,109,110,112,
113,114,116,117,118,122,
123,125,126,128,129,130

B. Health-protecting
19 persons

2,14,28,32,34,
46,48,59,61,78,
88,92,94,97112,
123,125,126,128

C. Health-destroying
17 persons

5,17,38,49,50,51,
54,68,75,81,82,
85,87,102,118,
122,130

2. Fine but unstatisfied
17 persons

3,6,19,31,41,45,55,58,64,69,
71,73,84,93,95,101,127

A. Healthy
10 persons

3,6,41,45,64,69,
84,93,96,127

C. Health-destroying
6 persons

31,5558,71,73,
101

3. Unwell and unstatisfied
43 persons

10,12,15,16,22,23,24,25,26,
27,29,33,36,39,40,43,53,57,
60,62,66,74,77,79,83,86,91,
95,98,99,100,103,104,105,
106,107,108,111,115,120,
121,124,131

A. Healthy
20 persons

10,15,27,29,33,
36,40,53,57,60,
62,66,79,83,86,
91,99,100,106,115

B. Health-protecting
14 persons

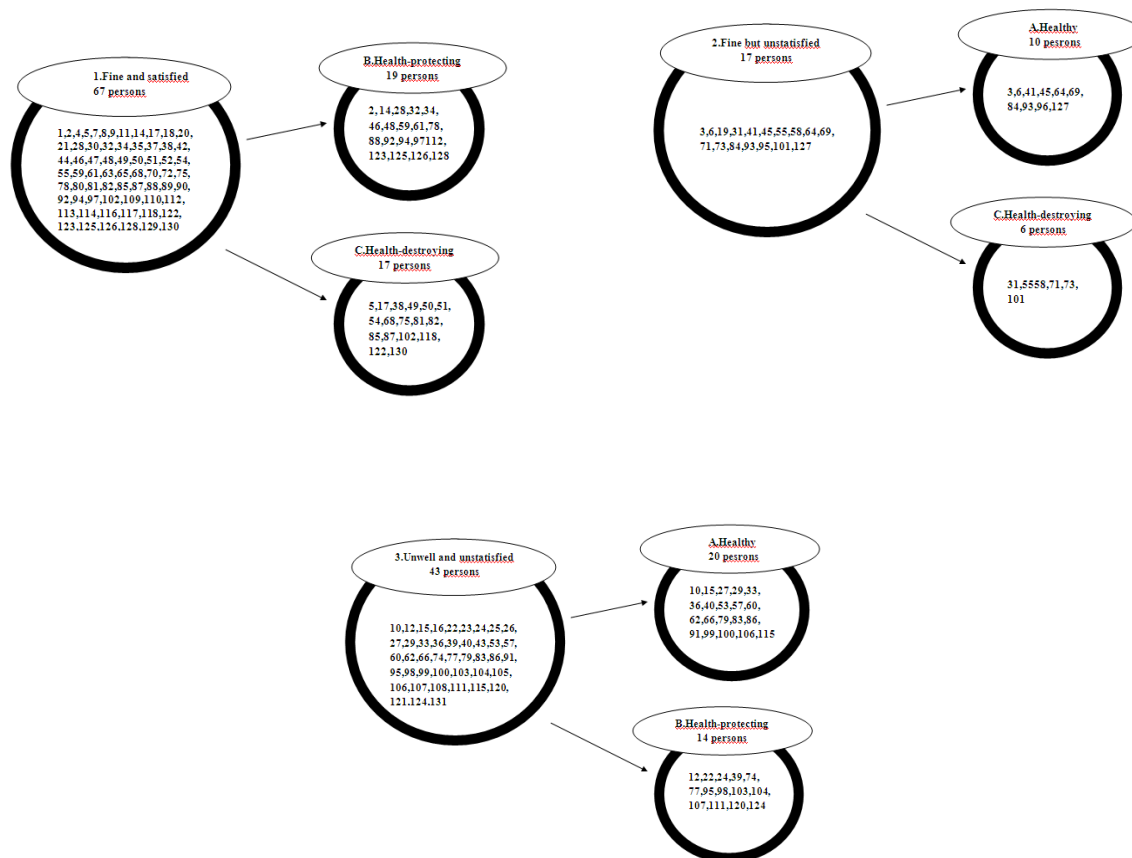12,22,24,39,74,
77,95,98,103,104,
107,111,120,124

Figure 2. Cluster-changers

Based on the subjective results, the first – 'Fine and satisfied' – cluster contained 67 individuals. After cross-checking them with the objective indicators, 19 of them got into the 'Health-protecting', while 17 into the 'Health-destroying' cluster. The second – 'Fine but unsatisfied' – cluster contained 17 individuals based on the subjective responses, most of whom got into another cluster due to their objective data. 10 individuals were categorized as 'Healthy' while another 6 people fell under the 'Health-destroying' cluster. According to the subjective results, 43 people fell under the third – 'Unwell and unsatisfied' – cluster. The number of 'cluster-changers' is also high in this cluster. Almost half of this third cluster's population, 20 individuals got into the 'Healthy' and another 15 into the 'Health-protecting' clusters after having conducted a cross-sectional study with objective results.

CONCLUSIONS

It can thus be concluded that the subjective and objective data do not overlap in most cases. The objective results of only 31 people in the 'Fine and satisfied' group were in harmony with the subjective self-rating of health. In the 'Unwell and unsatisfied' cluster only 9 out of 43 people's objective data did not challenge the subjective results. In the 'Fine but unsatisfied' cluster, the objective indicators prevailed to such an extent that there was only one person whose objective and subjective indicators showed the same outcome (Nagyváradi, 2014).

On the basis of all this, it can be stated that research works relying merely upon subjective information do not necessarily provide a realistic picture about the general health status in a given population.

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