

## Original paper

## Heart failure awareness: a cross-sectional study on misconceptions and educational opportunities

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**Summary**

Heart failure (HF) is an increasing cause of cardiovascular morbidity and mortality. However, the lay public awareness about HF is shown to be inferior to the knowledge of myocardial infarction or stroke. The vast majority of HF patients lack basic comprehension of HF and self-care, which translates into suboptimal treatment outcomes. Therefore this study aimed to establish the present level of knowledge about HF of the lay public and to evaluate the effects of a single public lecture for the consideration of implementing further steps to raise public awareness.

**Design and methods:** We performed a cross sectional survey study using an anonymous questionnaire designed by the German Competence Network Heart Failure (CNHF). Respondents were selected randomly and fulfilled the questionnaire free-willingly prior to and after a standardized lecture on HF. The CNHF questionnaire consisted of two sets of questions focusing on individual characteristics of the respondent and HF-related knowledge. The gathered data were verified by a standardized procedure in Würzburg, Germany.

**Results:** Among 1025 respondents 60% were females: 15% of the participants had occupational experience in the medical field. The majority (79%) of the study population had heard about HF previously. Typical complaints and symptoms of HF were correctly identified as 'shortness of breath' by 69%, 'swelling of feet' by 56%, 'fatigue' by 56%, and 'weakness' by 54% survey participants. The lecture resulted in 22% (from 26% to 48%) increase of correct identification of the combination all three HF symptoms (shortness of breath, swelling of feet and tiredness). The lecture significantly increased the proportion of correct answers for most of the questions. Particularly notable gains were observed in respondents without prior medical experience.

**Conclusions:** The study population's initial awareness of HF was insufficient. Standardized lecture improved the short-term knowledge about HF symptoms and nature of the disease. Regular educational activities increasing the HF awareness of general population and HF patients can increase the overall HF treatment success.

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**Background**

Heart failure (HF) represents a possible end stage of any cardiovascular disease; therefore its socioeconomic burden and prevalence steadily

increases, affecting approximately 1–2% of general population [1]. I.e. the overall economic cost globally of HF in 2012 was estimated at \$108 billion per annum [2]. Hence, appropriate health care strategies and strong public awareness about HF are in demand.

Information on the level of awareness among the general population in different countries regarding clinical signs and symptoms of HF, im-

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portance of early diagnosis, targeted treatment, beliefs and misconceptions is scarce [3–5].

The Heart Failure Association of the European Society of Cardiology launched the Heart Failure Awareness Day to initiate public campaigns about HF awareness across Europe. In Lithuania, we conducted a survey among the general public during the campaign events, aiming to evaluate general public awareness about HF and the possibility of a standardized lecture to improve such knowledge.

Treatment of HF is multi-modal, combining pharmacological, surgical and educational approaches. Establishing and maintaining an effective communication and partnership between health care providers and HF patients is a key in the management of HF [6,7]. Importantly, the vast majority of HF patients lack knowledge on self-care strategies regarding the detection and management of symptoms and comorbidity-associated problems of HF [3,8]. Educational programs for patients with HF proved not only effective in reducing health care costs, but also improving quality of life and increasing disease knowledge [7,9,10]. Accordingly, improved self-empowerment ultimately translates into improved adherence to treatment and better long-term prognosis [11,12].

To the best of our knowledge, no other study of this extent analysed the general awareness of HF in Lithuania. We aimed to determine the level of awareness and knowledge on HF in lay public and to evaluate, whether a single lecture may improve such knowledge.

## Design and methods

The present cross-sectional study was carried out during the European Heart Failure Awareness (HFA) Day 2013 in Lithuania. The HF questionnaire campaign was coordinated by The German Competence Network Heart Failure (CNHF) and conducted in Germany, Slovenia, Romania, and Lithuania [5]. The Lithuanian survey was carried out at three regional and two university hospitals, also in public places. A total of 1025 Lithuanian respondents participated in the survey. The study sample included patients (not necessarily suffering from HF), caregivers, medical staff members, healthy hospital employees, and shopping centres' visitors. There were no inclusion or exclusion criteria for eligibility to participate in the study. All respondents decided to fill the questionnaire free-willingly.

Participants were asked to complete a questionnaire prior to and after a standardized lecture on HF. The questionnaire was designed by CNHF and

translated into Lithuanian language. The questionnaire consisted of two parts with questions focusing on individual characteristics of the participant and HF-related knowledge.

The first part inquired about participant's gender, age category, and working experience in the medical field. Further questions addressed, whether they had heard about HF before and if they or their relatives were suffering from diabetes, stroke, heart attack, HF, hypertension, or had elevated cholesterol levels. In the second part of the questionnaire the participants were asked multiple-choice questions dealing with medical conditions leading to hospitalization (i.e. heart attack, stroke, cancer, high blood pressure, heart failure and diabetes mellitus).

After completion of the first questionnaire, a medical professional delivered a standardized 20-minutes lecture on HF, highlighting clinical presentation, economic burden and treatment options. This lecture specifically dealt with frequent HF-related misconceptions and provided advice on self-care. After the lecture the participants were given the opportunity to ask questions, and completed the same questionnaire for the second time.

Anonymous information was collected and analyzed keeping confidentiality of participant (no personal sensitive data were obtained). Scans of completed questionnaires were made using a dedicated scanning tool and automatically transferred into a database.

## Data analysis

All statistical analyses were carried out using IBM SPSS software package (version 21.0; SPSS Inc., Chicago, IL). Chi-squared test was used to compare the frequencies of the categorical values. P-value lower than 0.05 was considered as statistically significant. If in doubt of the intended answer by the respondent (e.g.: smudging, crossing out etc.) or in case of missing answers, the data of that question was excluded from the analysis.

## Results

In total, 1025 respondents completed two sets of questionnaires (i.e., before and after the lecture). Out of those, 31% were younger than 50 years, 43% were between aged 50 to 69 years, and 26% were older than 70 years. About 60% of the respondents were female. Experience of working in the medical field had 150 (15%) of the respondents. The vast majority (79%) of the participants

**Table 1.**  
Baseline characteristics of and responses among Heart Failure Awareness Day attendees 2013 ( $n = 1025$ )

	<i>n</i>	%
<b>Gender</b>		
Male	383	39.4
Female	590	60.6
<b>Age group, years</b>		
≤39	204	20.1
40–59	305	29.8
60–79	464	45.3
≥80	43	4.2
<b>I know the symptoms of heart failure</b>	296	65.9
<b>What are the typical complaints and symptoms of heart failure?</b>		
Headache	220	21.5
Tiredness	566	55.2
Weight gain	286	27.9
Dizziness	348	34.0
Shortness of breath	691	67.4
Sweating	295	28.8
Weakness	543	53.0
Paralysis	27	2.6
Vomiting	39	3.8
Sudden chest pain	465	45.4
Swelling of feet and legs	569	55.5
<b>Heart failure is a normal symptom of old age (no)</b>	501	66.4
<b>Heart failure affects multiple organs (yes)</b>	580	75.8
<b>Should patients with heart failure avoid sports activities? (no)</b>	239	30.4
<b>First hospital admission: chances of survival for patients suffering from HF are worse than with most types of cancer (yes)</b>	314	41.5
<b>How can heart failure be treated?</b>		
Psychotherapy	79	7.7
Pacemaker	511	49.9
Diet	424	41.4
Light therapy	18	1.8
Heart surgery	489	47.7
Talk therapy	55	5.4
Sport	264	25.8
Pharmacotherapy	785	76.6
Bed rest	125	12.2
Chemotherapy	8	0.8
Acupuncture	33	3.2
I do not know	60	13.5

HF – heart failure.

had heard about HF prior to participating in this survey (Table 1).

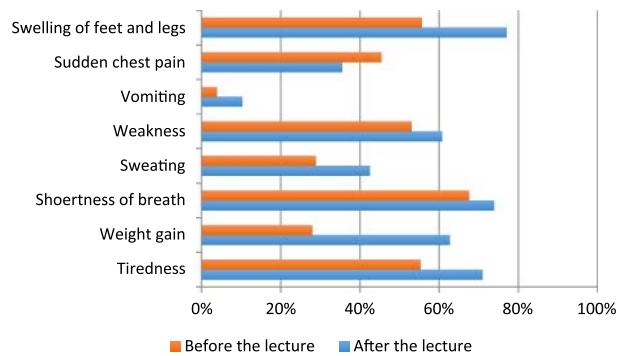
### **Improvements after the lecture**

Typical complaints and symptoms of HF were correctly identified ‘shortness of breath’ of 69%, ‘feet swelling’ of 56%, ‘fatigue’ of 56% and ‘weakness’ of 54% survey participants. Identification of typical symptoms and complaints of HF were improved after the lecture, see in Fig. 1. After the lecture substantial part of participants who cor-

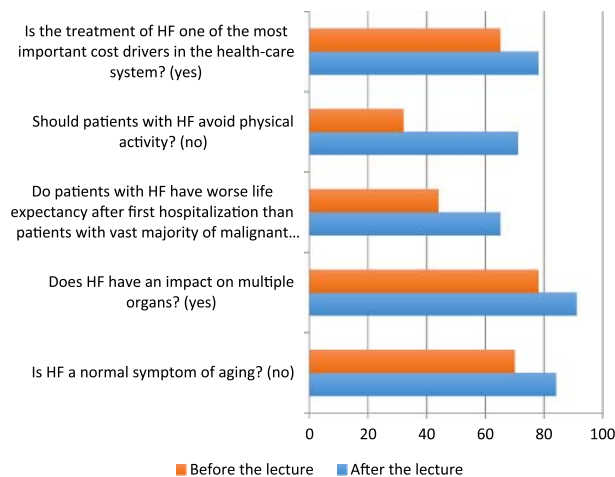
rectly identified all three symptoms (shortness of breath, swelling of feet and tiredness) increased from 26% and 48%.

Before the lecture number of correct answers about the nature and significance of HF ranged from 32% to 78% (Fig. 2). A significant positive change was observed in the essential answers after the lecture: rate of correct answers increased from 65% to 91%, all  $p < 0.001$  (see Fig. 2).

Of note, 61% ( $n = 396$ ) of the respondents changed their mind from a wrong to the right



**Figure 1.** Identification of typical symptoms and complaints of heart failure before and after the lecture.



**Figure 2.** Changes in distribution of answers to questions with yes/no answers before and after the lecture.

answer to the question ‘Should patients with HF avoid physical activity?’ due to the data provided during the lecture.

In the case of the question with several possible correct answers ‘How can heart failure be treated?’ the most predominant answer was ‘pharmacotherapy’ with 78% ( $n = 760$ ) of the respondents selecting it prior to the lecture. Other common selections included ‘pacemaker therapy’ 51% ( $n = 494$ ), ‘cardiac surgery’ 49% ( $n = 474$ ) and ‘diet’ 43% ( $n = 414$ ). After the lecture, ‘pharmacotherapy’ continued to be the leading option selected by 86% ( $n = 832$ ), followed by ‘Pacemaker therapy’ with 77% ( $n = 744$ ), ‘diet’ with 74% ( $n = 717$ ) and ‘cardiac surgery’ with 63% ( $n = 613$ ). The highest growth in correct answers was observed in the treatment with ‘exercise’  $\Delta = 49\%$  ( $n\Delta = 250$ ).

To the question with multiple choice answers ‘Which concomitant diseases can be caused or worsened by HF?’, ‘cardiac arrhythmias’ was the leading choice selected by 77% ( $n = 743$ ) and 83% ( $n = 813$ ) of the volunteers before and after the lecture, respectively. Subsequent to the presentation, an increase in times each answer was chosen was observed in all selections except for ‘I don’t

know’ (fall from  $n = 149$  to  $n = 31$ ). The main change by 20% was seen in ‘renal dysfunction’ (from  $n = 450$  to  $n = 676$ ,  $p < 0.001$ ).

### A surprising finding

To the question, which medical condition most often leads to hospitalization, the most common choice before the lecture was ‘heart attack’ with 42% ( $n = 392$ ) of all choices (in comparison: ‘heart failure’ 36%, ‘hypertension’ 30%, ‘stroke’ 29%, ‘cancer’ 28%, ‘diabetes’ 21%). However, when the same question was posed after the lecture, the most frequently selected answer was ‘hypertension’ with 84% ( $n = 782$ ) of all the choices, i.e. a rise of 175% ( $\Delta = 498$ ) when compared with answers prior to the lecture. This curious tendency shifted the rate of correct answers (‘heart failure’) down to 26% ( $n = 239$ ) instead of an expected rise.

### Impact of the occupation and education: medical vs. other

Prior to the lecture, significant differences in number of correct answers were seen between those not familiar with the medical field and medical staff, as one could expect (see Table 2).

After receiving information on HF, medical staff’s proportion of correct answers to whether heart failure (HF) is a normal trait of ageing climbed just by 1.8% (90%,  $n = 121$ ,  $p = 0.567$ ), but we observed a significant increase ( $\Delta = 16\%$ ) in correct answers among those without medical education (83%,  $n = 624$ ,  $p < 0.001$ ). Higher percentage of correct answers remained in the medical profession group, unlike in the cases of other single choice questions, where difference was not significant.

### Preferred sources for searching information about HF

Cardiologist’s consultation was the main selected source constituting 31% ( $n = 797$ ) of all the picks before and 29% ( $n = 885$ ) after the lecture, and it was ticked by 82% and 91% of the respondents ( $n = 975$ ) prior and post the lecture, respectively. Under the influence of the lecture, a significant rise was detected in selections of ‘Internet’ from 43% ( $n = 417$ ) to 51% ( $n = 500$ ) and ‘patient guides’ from 22% ( $n = 216$ ) to 40% ( $n = 385$ ,  $p < 0.001$ ). Gender did not play a significant role while picking answers to this question. Those who knew about HF beforehand were more likely to choose ‘Internet’ and ‘patient guides’ before than after the lecture 17% ( $n = 359$ ) and 9% ( $n = 189$ ) vs. 12% ( $n = 49$ ) and 6% ( $n = 24$ ), respectively. However, those who had not heard about HF before, reached higher percentage of ‘patient guides’ selection than those who had

**Table 2.** Comparisons between the rate of correct answers of non-medical and medical field respondents before and after the lecture

	Participants with work experience in medical field		Other participants		<i>p</i> between the groups
	Before the lecture, <i>n</i> (%)	After the lecture, <i>n</i> (%)	Before the lecture, <i>n</i> (%)	After the lecture, <i>n</i> (%)	
Is HF a normal symptom of aging? (no)	118 (87.4)	121 (89.6)	501 (66.4)	624 (82.6)*	<0.001
Does HF have an impact on multiple organs? (yes)	111 (89.5)	115 (92.7)	580 (75.8)	695 (90.8)*	<0.001
Do patients with HF have worse life expectancy after first hospitalization? (yes)	65 (52.8)	80 (65.0)	314 (41.5)	496 (65.5)*	0.015
Should patients with HF avoid physical activity? (no)	53 (42.1)	82 (65.1)*	239 (30.4)	568 (72.3)*	0.009
Is the treatment of HF one of the most important cost drivers in the health-care system? (yes)	83 (69.7)	93 (78.2)	486 (64.2)	589 (77.8)*	0.238

HF – heart failure; \* – *p* < 0.05 considered as significant, compared in corresponding group to baseline.

17% (*n* = 91) and 12% (*n* = 286) of all selected choices, respectively (*p* < 0.001). When compared by age, the group of 70 years and over showed significantly lower preference of Internet help 8% (*n* = 48) than other age groups 23% (*n* = 196) by under 50 years and 16% (*n* = 173) by 50–69 years prior to the lecture (*p* < 0.001). Consulting a certified cardiologist was the most prevalent choice by respondents in all age groups both prior 28% (*n* = 235); 32% (*n* = 346); 34% (*n* = 212), ascending order and after 28% (*n* = 270); 29% (*n* = 372); 32% (*n* = 238), ascending order the lecture.

### Discussion

Heart failure affects one in five people in their lifetimes and carries a high human and economic cost. Due to the aging population, HF is becoming increasingly prevalent [13,14]. Despite its prevalence, HF is poorly understood by many people, and often goes unrecognized by health-care professionals.

Evidence shows that across Europe, only 3% of people can correctly identify the symptoms of HF [3]. It has been shown that knowledge about HF or the lack thereof has an impact on the life quality and clinical outcome of such patients [15,17]. Many misconceptions accompany the diagnosis and management of HF and may lead to poor or at least suboptimal self-care [18].

This is the first study aiming to assess the pre-existing level of knowledge on HF and evaluating the effects of a single lecture among the general public in Lithuania to assess the potential necessity for regular public awareness activities.

#### Knowledge about HF

This study revealed poor knowledge about HF in all aspects. Although 79% of Lithuanian respondents had previous knowledge about HF, only 26% of respondents correctly identified symptoms of HF. Comparing our results to other studies, there are many similarities among respondents in terms of knowing about HF and correct identification of typical complaints and symptoms of HF from its clinical description: 86% and 3% in SHAPE study (2002) [3], 72% and 36% in Germany (2012) [19], 83% and 30% in Slovenia (2011) [4], respectively. SHAPE was conducted in 2002 and reported the lowest numbers of respondents who knew all three main symptoms of HF. Despite the growing number of respondents, over 10 years the awareness level did not increase significantly. This illustrates that there is still a long way to go until this most basic knowledge has been transmitted to the population at large.

The most prominent misconception was that one third of respondents considered that HF is a natural consequence of aging. Interestingly, other studies reported similar results [3,4,19]. This resonates with another finding stating that staggering 56% of the respondents were not aware of HF patients having worse life expectancy after the first hospitalization than the majority of patients with cancer. A similar finding was discovered in other countries and the SHAPE study [3,4,19].

Regarding treatment strategies applied to HF, pharmaceutical and interventional therapies were the preferred options by the Lithuanian participants. Although drugs, pacemakers and heart surgery do play a very important role in the management of HF, non-invasive means of improving life quality like psychotherapy and talk therapy were completely disregarded as a treatment option. HF and other chronic conditions alike are often accompanied by depressed moods or depression [20,21]. As well as damaging the life quality of HF sufferers, this combination may undermine their compliance [21].

Our study was designed to stratify respondents into subgroups based on work experience in medical field (doctors, nurses) or the lack thereof (all other professions and patients). As expected, the overall knowledge on HF was superior in subjects with prior medical experience. Nonetheless, the medical staff members within our study population demonstrated some important gaps regarding the appropriate perception of HF. The HF awareness survey also revealed considerable gaps in terms of awareness, perception and management of HF among European health care providers [3]. HF remains a difficult clinical issue and represents a major challenge for health care providers (HCP). Keeping in mind the growth of HF prevalence, the educational programmes to increase HCP knowledge about HF are clearly needed.

We managed to achieve improvements in the rate of correct answers to virtually all the questions after the lecture. This study is therefore potentially applicable to clinical practice, as it analysed the dynamics of level of knowledge on HF after the single lecture. Firstly, the present report and similar studies provide us with necessary insight for future planning of our efforts in order to optimize outcomes and benefits. Secondly, these results should be put into the perspective of HF perception and understanding amongst patients, health care professionals and general population. Changes in national health care policies should be pursued to entrust the public health centers and health care institutions with continuous promotion and iterative campaigns about

healthy lifestyle and preventive activities to reduce disease-associated costs and disability.

### **Study limitations**

Several limitations of our study need to be considered. The time span between the end of the lecture and the collection of the post-lecture questionnaires was about half an hour. Therefore, we were unable to evaluate the longer-term impact of the knowledge delivered during the lecture. As the study was carried out on the same day in hospitals and public places throughout the country, different health care professionals delivered the lecture. The presenters varied in lecturing experience, which may have introduced inconsistencies in its delivery and therefore the study results. A couple of single-choice were misinterpreted as multiple-choice questions, which motivated us to apply subtle changes when assessing the results and took away some precision. Our study population was not exclusively made up of HF patients, but a convenience sample of healthy and ill individuals who happened to be in the hospital and shopping centres at that time.

### **Conclusions**

The level of awareness on heart failure in a mixed group of study subjects including general population, medical staff members and cardiology outpatients, was found to be lacking. The standardized lecture markedly improved the short-term knowledge about HF symptoms and nature of the disease, although the lasting effects of such information transfer remain unclear. Activities on education and awareness in general population and in HF patients should be continued.

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