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# Attitudes towards implantable cardioverter-defibrillator therapy: a national survey in Danish health-care professionals

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## Aims

The aim of this study was to examine health-care professionals attitudes towards implantable cardioverter-defibrillator (ICD) therapy and issues discussed with patients.

## Methods and results

Survey of 209 health-care professionals providing specialized treatment and care of ICD patients at the five implanting centres in Denmark. Questions pertained to gender, age, years of experience within the field, knowledge of the ongoing critical debate on ICD therapy, and personal experience with ICD treatment, and/or sudden cardiac arrest within family and/or friends. Of all participants, 185 (88.5%) completed the survey. Physicians spent less time informing patients about ICD treatment prior to implantation (mean min =  $17.7 \pm 11.2$  vs.  $28.6 \pm 19.4$ ;  $P < 0.001$ ). They were more likely to discuss clinical issues but less likely to discuss psychosocial issues with patients compared with non-physicians. Physicians were less likely to believe that their personal attitude towards ICD treatment has no influence on how they deal professionally with patients (27.8 vs. 43.6%;  $P = 0.04$ ). Physicians and non-physicians were equally positive towards ICD therapy as primary prophylaxis in ischaemic cardiomyopathy (87.6 vs. 82.1%;  $P = 0.40$ ) but not in non-ischaemic cardiomyopathy (57.3 vs. 83.9%;  $P < 0.001$ ). Physicians were more positive towards ICD therapy as secondary prophylaxis (98.9 vs. 84.2%;  $P = 0.001$ ) compared with non-physicians.

## Conclusions

Physicians focus on clinical rather than psychosocial issues when discussing ICD treatment with candidate patients. At the same time, physicians are more aware that their attitude towards ICD treatment may influence how they deal professionally with patients compared with non-physicians.

## Keywords

Attitude • Delivery of health-care • Implantable cardioverter-defibrillator

## Introduction

Prophylactic treatment for sudden cardiac death with the implantable cardioverter-defibrillator (ICD), either as primary or secondary prevention, has an effective therapy, although it is currently the subject of some debate.<sup>1–3</sup> Implantable cardioverter-defibrillator treatment can be troublesome due to its side effects, which includes inappropriate shocks and infection as the most serious adverse clinical events. Implantable cardioverter-defibrillator treatment is also associated with psychological symptoms, such as

anxiety, depression, and post-traumatic stress, prevalent in 25–33% patients.<sup>4,5</sup> These psychological symptoms may be attributed to appropriate or inappropriate shocks<sup>6,7</sup> and symptomatic heart failure,<sup>8</sup> although recent evidence indicates that the patient's personality profile is at least as important as ICD shocks as a determinant of distress.<sup>9,10</sup>

The personal attitude of health-care providers towards ICD therapy may play a role in referral of patients for ICD treatment,<sup>11,12</sup> but also influence the information and advice they give to patients who are candidates for ICD implantation. Little is

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known about the general attitude of health-care professionals involved in the treatment and care of ICD patients,<sup>13</sup> towards ICD therapy and in addition towards specific issues such as deactivation of the ICD in terminally ill patients<sup>14–17</sup> and barriers to ICD therapy.<sup>11</sup>

Hence, we conducted a national survey among health-care professionals involved in the treatment and care of ICD patients in the five centres that perform ICD implantations in Denmark. The survey focused on issues that health-care providers may discuss with patients prior to ICD implantation and the general attitude of health-care providers towards ICD therapy.

## Methods

### Participants and study design

We approached all staff categories, involved in ICD treatment at the five ICD implanting centres in Denmark, due to the notion that attitudes towards ICD treatment and issues discussed with candidate patients may vary as a function of professional background. The staff were divided into the following categories: Electrophysiologists (implanting ICDs), cardiologists (not implanting ICDs), ICD nurses/technicians assisting at implant, ICD nurses/technicians in the outpatient clinic, ICD nurses on the ward, and others (e.g. secretary and engineer). The study group (i.e. the authors) identified the staff in the five categories within each center. The study was endorsed by the Danish Working Group of Electrophysiology and Cardiac Pacing.

A questionnaire was mailed to each participant. If the questionnaire was not returned within 3 weeks, a reminder was mailed together with a copy of the survey. Handling of the questionnaire and data aggregation was conducted by an independent research institution, Uni-C (Aarhus, Denmark), in order to safeguard the participant's anonymity. The study group was blinded with regard to individual recognition of the participant.

### Measures

A purpose-designed questionnaire was developed for the current study by the first (J.B.J.) and the last author (S.S.P.) to examine the general attitude of health-care providers towards ICD treatment and issues that they discuss with candidate ICD patients prior to implantation. Questions pertained to gender, age, years of experience within the field, knowledge of the ongoing critical debate on ICD therapy<sup>2</sup> (i.e. possible overestimation of the clinical benefits of ICD therapy in terms of a low proportion of patients who experience appropriate ICD shock but higher than expected rate of complications<sup>4</sup>), personal experience with ICD treatment, and/or sudden cardiac arrest within family and/or friends, and whether there should be an imaginary biological upper age limit for ICD implantation. The questionnaire also tapped clinical (e.g. risk of infection) and psychosocial issues (e.g. impact of ICD on body image) discussed with patients prior to ICD implantation, and the time spent to inform the patient prior to ICD implantation. Finally, the questionnaire assessed attitudes towards ICD therapy as primary and secondary prophylaxis in ischaemic and non-ischaemic cardiomyopathy, and the belief 'my personal attitude towards ICD treatment has no influence on how I deal professionally with ICD patients'.

### Statistical analysis

Prior to statistical analyses, the staff categories were dichotomized into physicians vs. non-physicians and the age groups into <50 vs. ≥50 years of age. Nominal variables were analysed with the  $\chi^2$  test,

whereas Student's *t*-test was used for continuous variables. Pearson's correlation analysis was used to examine the relationship between years of experience and number of clinical and psychosocial issues discussed with patients. Logistic regression analysis was used to examine correlates of the belief 'my personal attitude towards ICD treatment has no influence on how I deal professionally with ICD patients'. For the results of the logistic regression analysis, the odds ratios (ORs) and their corresponding 95% confidence intervals (CIs) are reported. All tests were two-tailed, and a *P*-value of <0.05 was used to indicate statistical significance. All data were analysed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

## Results

### Participant characteristics

The questionnaire was distributed to 209 health-care professionals involved in the treatment and care of ICD patients, with 185 (88.5% response rate) agreeing to participate. The age distribution of the participants was as follows: <30 years = 4.3% (8/185); 30–39 years = 14.6% (27/185); 40–49 years = 40.0% (74/185); 50–59 years = 30.8% (57/185); and >60 years = 10.3% (19/185). The distribution across staff categories was as follows: Electrophysiologists (implanting ICDs): 12.4% (23/185); cardiologists (not implanting ICDs): 36.2% (67/185); ICD nurses/technicians assisting at implant: 18.4% (34/185); ICD nurses/technicians in the outpatient clinic: 9.2% (17/185); ICD nurses on the ward: 22.2% (41/185); and others (e.g. secretary, engineer): 1.6% (3/185).

Participant characteristics stratified by physician status are presented in *Table 1*. Physicians were more often male, had more years of experience with ICD therapy, and were also more likely to be aware of the ongoing critical debate on ICD treatment compared with non-physicians (84.4 vs. 58.9%; *P* < 0.001). Physicians were less likely to hold the belief that 'my personal attitude towards ICD treatment has no influence on how I deal professionally with ICD patients' (27.8 vs. 43.6%; *P* = 0.04). No statistically significant differences were found on age and personal experience with ICD treatment and/or sudden cardiac arrest between physicians and non-physicians.

### Issues discussed with patients prior to implantable cardioverter-defibrillator implantation

Physicians reported that they spent a mean of  $17.7 \pm 11.2$  min to inform the patient prior to ICD implantation in contrast to non-physicians who spent a mean of  $28.6 \pm 19.4$  min (*P* < 0.001). Clinical and psychosocial issues discussed with patients prior to ICD implantation, stratified by staff category (physicians vs. non-physicians) are shown in *Table 2*. Generally, physicians were more likely to discuss clinical issues with patients, such as risk of re-operation (63.5 vs. 32.1%; *P* < 0.001) and the prognostic advantage of having an ICD (100 vs. 89.4%; *P* = 0.006) compared with non-physicians. In contrast, physicians were less likely to touch upon any of the psychosocial issues related to ICD treatment, including impact on the quality-of-life (74.1 vs. 88.4%; *P* = 0.03), sexual activity (20.0 vs. 44.9%; *P* = 0.001), impact on family and children (35.7 vs. 78.0%; *P* < 0.001), impact on body image (16.5

**Table 1** Participant characteristics stratified by staff category (physician vs. non-physician)<sup>a</sup>

	Valid cases	Total sample (n = 185)	Physician (n = 90)	Non-physician (n = 95)	P-value
Female gender	185	51.9% (96)	12.2% (11)	89.5% (85)	<0.001
Age ( $\geq 50$ years)	185	41.1% (76)	46.7% (42)	35.8% (34)	0.18
Years of experience with ICD therapy, mean $\pm$ SD	181	9.5 $\pm$ 5.7	10.8 $\pm$ 5.4	8.2 $\pm$ 5.7	0.002
Aware of current critical debate on ICD therapy	185	71.4% (132)	84.4% (76)	58.9% (56)	<0.001
Personal experience with ICD treatment and/or sudden cardiac arrest <sup>b</sup>	185	29.7% (55)	31.1% (28)	28.4% (27)	0.81
Holding the belief that 'my personal attitude towards ICD treatment has no influence on how I deal professionally with ICD patients'	184	35.9% (66)	27.8% (25)	43.6% (41)	0.04

<sup>a</sup>Listed as % (n) unless otherwise indicated.<sup>b</sup>Family member/friend having experienced a sudden cardiac arrest or family member/friend having an ICD.**Table 2** Clinical and psychosocial issues discussed with patients prior to ICD implantation, stratified by staff category (physician vs. non-physician)<sup>a</sup>

	Valid cases	Physician (n = 90)	Non-physician (n = 95)	P-value
Clinical issues				
Risk of infection	169	87.1% (74)	89.3% (75)	0.83
Risk of re-operation	166	63.5% (54)	32.1% (26)	<0.001
Risk of shock	170	97.6% (83)	96.5% (82)	1.00
Risk of device recall	158	20.0% (17)	11.0% (8)	0.18
Prognostic advantage	170	100.0% (85)	89.4% (76)	0.006
No. of items with positive endorsement, mean $\pm$ SD	185	3.48 $\pm$ 1.24	2.81 $\pm$ 1.23	<0.001
Psychosocial issues				
Impact on the quality-of-life	171	74.1% (63)	88.4% (76)	0.03
Impact on sexual activity	163	20.0% (17)	44.9% (35)	0.001
Impact on family/children	166	35.7% (30)	78.0% (64)	<0.001
Impact on body image	164	16.5% (14)	46.8% (37)	<0.001
Impact on driving	169	89.4% (76)	97.6% (82)	0.06
No. of items with positive endorsement, mean $\pm$ SD	185	2.22 $\pm$ 1.32	3.09 $\pm$ 1.58	<0.001

<sup>a</sup>Listed as % (n) unless otherwise indicated.

vs. 46.8%;  $P < 0.001$ ), and driving (89.4 vs. 97.6%;  $P = 0.06$ ). No statistically significant differences were found between implanting vs. non-implanting physicians on clinical and psychosocial issues discussed with patients (all  $P$ -values  $> 0.05$ ).

There was a tendency for health-care professionals, irrespective of profession, to discuss more clinical, and psychosocial issues with patients as a function of having more years of experience with ICD patients ( $r = 0.18$ ;  $P = 0.016$ ).

### Influence of personal attitude of professional caregivers towards implantable cardioverter-defibrillator treatment

Of all participants, one-third (35.9%) responded positive to the statement that 'my personal attitude towards ICD treatment has no influence on how I deal professionally with ICD patients'. Correlates of this belief are shown in Table 3, with females and those

older than  $\geq 50$  years being more likely to respond positively to this item, whereas health-care professionals with more experience with ICD patients and those aware of the current critical debate on ICD treatment were less likely to hold this belief.

### Attitude towards implantable cardioverter-defibrillator therapy

There was an overall positive attitude among physicians and non-physicians towards ICD therapy as primary prophylaxis in ischaemic cardiomyopathy (87.6 vs. 82.1%;  $P = 0.40$ ), but a lower proportion of physicians with a positive attitude towards ICD therapy as primary prophylaxis in non-ischaemic cardiomyopathy compared with non-physicians (57.3 vs. 83.9%;  $P < 0.001$ ). On the other hand, physicians were more inclined to have a positive attitude towards ICD therapy as secondary prophylaxis (98.9 vs. 84.2%;  $P = 0.001$ ). In both groups, around 40% endorse that there should be an upper age limit for ICD therapy ( $P = 0.76$ ),

**Table 3** Correlates of the belief ‘my personal attitude towards ICD treatment has no influence on how I deal professionally with ICD patients’

Correlates	OR	95% CI	P-value
Female, gender	3.92	1.26–12.17	0.02
Age $\geq$ 50 years	6.86	2.80–16.83	<0.001
Physician	1.82	0.60–5.55	0.29
Years experience with ICD patients	0.86	0.80–0.93	<0.001
Personal experience with ICD treatment and/or sudden cardiac arrest <sup>a</sup>	1.00	0.46–2.16	1.00
Aware of current critical debate on ICD treatment	0.37	0.17–0.82	0.01

<sup>a</sup>Family member/friend having experienced a sudden cardiac arrest or family member/friend having an ICD.

with physicians and non-physicians proposing that this upper limit be 82.2 and 80.7 years ( $P = 0.24$ ), respectively.

## Discussion

There has been a rise in the number of physician surveys focusing on ICD therapy in terminally ill patients. To our knowledge, however, this is the first study to examine the general attitudes of health-care providers who are involved in the treatment and care of ICD patients, and the extent to which they cover a broad range of ICD-related issues, capturing both clinical and psychosocial issues, when discussing ICD implantation with candidate patients. Generally, we found that health-care providers in ICD implanting centres had a positive attitude ( $>80\%$ ) towards ICD therapy. The rate of ICD implants in Denmark has increased from 105 per million inhabitants in 2005 to 207 in 2009. The proportion of patients with a primary prophylactic indication has increased from 8% in 2005 to 53% in 2009.<sup>18</sup> These figures also reflect the positive attitude among Danish physicians towards implantation of primary prophylactic ICDs. Implantation of an ICD as primary prophylaxis in patients with non-ischaemic cardiomyopathy was the only exception, with only 57% of physicians endorsing this indication. This attitude might be rooted in randomized controlled trials in patients with non-ischaemic cardiomyopathy, showing only marginal benefits of ICD therapy.<sup>19,20</sup> This despite primary prophylaxis in non-ischaemic cardiomyopathy is being classified together with primary prophylaxis in ischaemic dilated cardiomyopathy and secondary prophylaxis as a class I indication in current guidelines.<sup>21</sup> The ongoing DANISH study (A DANish randomized, controlled, multicentre study to assess the efficacy of ICD in patients with non-ischaemic Systolic Heart failure on mortality) will likely show whether ICD implantation for primary prophylaxis in non-ischaemic dilated cardiomyopathy is beneficial.

In the current study, physicians generally spent less time informing the patient about ICD treatment prior to implantation than non-physicians. Physicians were more likely than non-physicians to discuss clinical issues (e.g. risk of re-operation) with patients

but less likely to discuss psychosocial and emotional issues (e.g. impact of ICD on the quality-of-life and body image). These findings corroborate but also extend those reported by Sears et al.<sup>13</sup> who asked physicians and nurses and other health-care providers to rate the concerns of their patients and the extent to which they could manage these patient concerns. In their survey, physicians were less likely to observe that their patients would be concerned about emotional problems, such as fear, anxiety, and depression, and also considered themselves less capable of managing such emotional problems in their patients compared with nurses and other health-care providers.<sup>13</sup> On the basis of the data gathered for the current survey, we cannot determine whether physicians’ tendency to focus more on clinical aspects related to the device but less so emotional issues is attributable to an inability to cope with emotional problems, or simply reflects a greater importance given to clinical issues. Furthermore, there may be important differences in the information provided to patients with primary prophylactic indication when compared with secondary prophylactic indication, as the patient in the latter situation already have experienced a life-threatening event, and thus only need a short introduction to ICD therapy. However, the study did not include data on the level of information stratified by indication.

Given the evolvement and complexity of device therapy, with increases in device advisories and complications, including inappropriate shocks, and the associated negative publicity in the press leading to a refusal of ICD therapy in some cases as reported in the USA,<sup>2</sup> it seems particularly important to broach these issues with patients head on and at an early stage. The physicians in our survey do prioritize these clinical issues, although we cannot determine whether they also discuss the potential impact of these device-related complications specifically with respect to psychological functioning and the quality-of-life. This is important from the point of view of secondary prevention, given that psychological factors have been shown to increase the risk of ventricular tachyarrhythmias and mortality in ICD patients.<sup>6,22,23</sup> It is possible that a proactive, prophylactic psycho-educational approach may prove to be beneficial in this regard, although this needs to be confirmed in future studies.<sup>24,25</sup> The availability of a good multidisciplinary team that also includes a psychologist, who can deal with the more severe levels of distress, may very well be beneficial to patients who find it difficult to adjust to life with device therapy. The inclusion of a psychologist as part of the team has several advantages, including the implicit message to patients that seeing a psychologist is nothing out of the ordinary. In addition, physicians may be less fearful of broaching emotional issues, as they know that there is a psychologist on board the team to whom they can refer patients if necessary. Management strategies for distressed patients are available and have shown to be successful in reducing anxiety and improving their quality-of-life.<sup>26,27</sup>

This study has some limitations. The study only approached referring physicians for ICD treatment from within ICD implanting centres, and a potential bias towards a positive attitude towards ICD therapy cannot be excluded. As is the case with all surveys, there is a risk that participants provide socially desirable answers. However, the use of an independent research institution, Uni-C (Aarhus, Denmark), to handle the questionnaire and data



aggregation is likely to have kept this risk to a minimum. Despite these limitations, the study also has several strengths. These include the high response rate of 88.5% and the generalisability of the findings to all health-care providers involved in the treatment and care of ICD patients in Denmark. Most other surveys on issues related to ICD treatment, such as deactivation of the device, tend to have focused on physicians only or to have a relatively poor response rate.<sup>11,14,28</sup>

In conclusion, this study reporting on the results of a national survey of attitudes of health-care providers involved in the treatment and care of ICD patients in Denmark showed that ICD treatment was generally well accepted, except from inpatients with non-ischaemic cardiomyopathy. Physicians tended to focus more on clinical rather than psychosocial issues when discussing ICD treatment with candidate patients compared with non-physicians, and also to spend less time providing information on ICD treatment to patients prior to implantation. At the same time, physicians were more aware that their attitude towards ICD treatment might influence how they deal professionally with patients compared with non-physicians. The influence of attitudes of health-care providers towards ICD treatment for patients should not be underestimated and should be the subject of future research.

**Conflict of interest:** J.B.J. is a consultant for Medtronic. P.T.M. has received research grants from Medtronic. S.S.P. is consultant for Medtronic, St. Jude Medical and Cameron Health.

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