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REVIEW ARTICLE

# Advance care planning in motor neuron disease: A systematic review

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## ABSTRACT

*Objective:* Motor neuron disease (MND) is an incurable progressive illness, characterized by incessant deterioration of neuromuscular function. Timely commencement of advance care planning (ACP) may enable patients to participate in future care choices. The present systematic review aimed to summarize what is known about the prevalence, content, patient/caregiver benefits, healthcare professional (HCP) awareness/support, and healthcare outcomes associated with ACP in the MND setting.

*Method:* Quantitative and qualitative studies were identified through database searches and eligibility assessed by one author and verified by her coauthor. Data extraction and quality assessments against standardized criteria were completed by the two authors.

*Results:* Of the 422 studies identified, 16 were included. The research methods generally lacked rigor. Advance directive (AD) prevalence varied considerably across studies. Disease progression was the strongest predictor of AD completion. ACP processes may clarify patients' wishes and promote communication. HCP attitudes or lack of awareness may limit ACP processes. Varying patient preferences may make flexible approaches and timing necessary.

*Significance of results:* Important benefits may be associated with ACP in the context of a motor neuron disease (e.g., feelings of control/relief and refusal of unwanted treatments). However, further evidence is required to verify findings and identify optimal streamlined approaches (e.g., use of decision aids) consistent with patients' (and caregivers') needs over time.

**KEYWORDS:** Advance care planning, Motor neuron disease, Amyotrophic lateral sclerosis, Systematic review

## INTRODUCTION

Motor neuron disease (MND), or amyotrophic lateral sclerosis (ALS), is an incurable progressive neurodegenerative disease (Herz et al., 2006). Although 50% of patients die within three years of its onset, usually from respiratory failure (Mitchell & Borasio, 2007), medical technologies can now prolong the lives of many individuals living with MND (Dawson & Krist-

janson, 2002). The majority of patients retain or have mildly diminished cognitive capacity, though their ability to communicate steadily diminishes along with continual loss of neuromuscular functioning (Talbot, 2002). A range of physiological (e.g., nutrition, respiration, infection) and psychological (e.g., anxiety, depression) issues may impede patients' quality of life (QoL) as the disease advances (Hoffman, 2008). Decision making related to life-sustaining treatments and care options are likely to be complex and emotionally challenging for both patients and family members. In cases where mechanical ventilation is initiated, it is then required for the remainder of a patient's life,

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and decisions are irreversible if patients become “locked in” (Hoffman, 2008).

Advance care planning (ACP) is a patient-centered process, designed to ensure that healthcare decisions are guided by preconsidered patient preferences (Fried et al., 2009). Accurate and timely documentation of patient preferences in relation to life-sustaining treatments via advance directives (ADs) (e.g., healthcare proxy designation, living will) are integral to ACP, as is the consideration and articulation of goals of care and facilitation of family discussion to promote a shared understanding of these goals (Fried et al., 2009). This may provide further assurance that patients’ wishes are honored. Benefits from ACP have been reported in general medical settings for patients and caregivers. In one Australian study, patients who engaged in ACP were more likely to have their wishes known and respected, and their relatives reported less stress, anxiety, and depression (Detering et al., 2010). Patients with an AD have also been found to have fewer hospitalizations and be more likely to die at home, in a hospice, or nursing home (Molloy et al., 2000; Teno et al., 2007). However, less favorable indications from ACP are also evident in the literature (Schneiderman et al., 1997), and unmet needs during end-of-life care are still commonly reported by bereaved family members (Teno et al., 2007). Benditt and colleagues (2001) focused on the importance of disease-specific ACP tools to overcome ambiguity in directives and thereby improve outcomes.

In the United States, federally funded healthcare institutions are required to inform patients of their personal right to be involved in decision making and complete an AD (Salmond & David, 2005). The rate of completion may be higher in some institutions or regions as a result of such policies. Despite an increasing focus on enhancing patient autonomy and dignity in end-of-life care evidenced by such legislation, the attitude of healthcare professionals (HCPs) toward ADs may be ambivalent. For instance, a Scottish qualitative study found both positive and negative attitudes among HCPs toward ADs and perceived the degree to which patients comprehended their illness and future incapacity as a potential limitation (Thompson et al., 2003). In a review of end-of-life care in ALS, Mitsumoto and coworkers (2005) outlined a need for enhanced communication and partnership development among patients, physicians, and family members and recommended investigation of optimal timing and approaches to discussing end-of-life care issues, including identification of decision points and standardized treatment discussions.

Despite the relevance of ACP to MND, there is sparse literature on this topic specifically related to MND, and to our knowledge there are no previous reviews that summarize what is known. The aim of this

review was therefore to systematically assess qualitative and quantitative studies investigating ACP in relation to MND. Specifically, the review considered: prevalence and predictors of ACP; optimal timing, content, and format of discussion and documentation processes; perceived benefits of ACP for patients and caregivers; healthcare providers’ awareness and acceptance of ACP; and evidence of the impact of ACP on key outcomes.

## METHODS

### Eligibility Criteria

Peer-reviewed English-language studies investigating ACP in the context of MND/ALS were included. Investigations of ACP could involve discussion and/or documentation of patient wishes and directives or goals of care. Qualitative and quantitative studies were sought for fuller comprehension of the evidence base. Studies involved people living with MND and/or family members and health professionals caring for (or having cared for) this patient population, in any setting. Samples comprising patients, family members, and healthcare professionals with different illnesses were included when separate analyses were conducted for the MND subgroup. Case studies (including legal cases/court rulings), conference abstracts, editorials, commentaries, and reviews were excluded.

### Search Strategy and Screening

A search of relevant databases (MEDLINE, CINAHL, EMBASE, and SCOPUS) was conducted. The following terms were used to conduct the search: “motor neuron disease”; “amyotrophic lateral sclerosis”; “Lou Gehrig\* disease”; “advance care plan\*”; “advance (directive\* or decision\*)”; “living will”; “right to die”; “power of attorney”; and “Ulysses (contract\* or directive\*).” These terms were modified slightly to suit the nomenclature of the respective databases. Search results were screened for duplicates and irrelevant articles. The remaining articles were assessed for inclusion in accordance with the eligibility criteria by one author (LM) and verified by the other (PB). The reference lists of included articles were scrutinized for additional articles.

### Quality Assessment

The quality of studies was based on the standardized quality assessment tool “Qualsyst,” developed by Kmet and colleagues (2004) to evaluate primary research papers. This assessment tool was selected due to its separate scoring systems for qualitative and quantitative approaches and its detailed instruction manual for quality scoring. One author (LM)

assessed the quality of all studies and the other (PB) assessed a portion of the studies, with any differences detected being resolved through discussion until consensus was reached. The quality of included studies, measured by final scores, is documented in the summary tables (see Tables 1–5).

### Data Extraction

Data were extracted from the articles in accordance with the key areas of investigation outlined in the following research domains: prevalence and predictors of ACP; optimal timing, content, and format of discussion and documentation processes; perceived benefits of ACP for patients and caregivers; healthcare providers' awareness and acceptance of ACP; and evidence of the impact of ACP on key outcomes. Summary tables for each research question were created (see Tables 1–5), with articles ordered by quality rating, from highest to lowest. These tables were utilized to clarify discrete research findings and facilitate data synthesis and overall analysis for this review.

### Data Synthesis

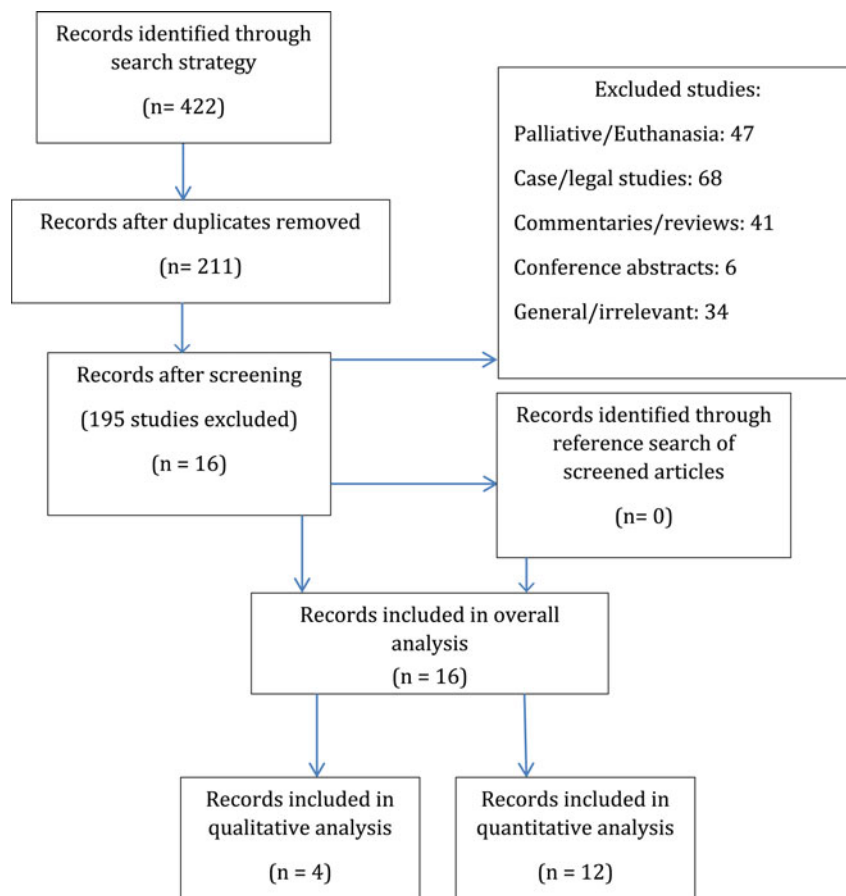
A narrative approach was adopted to synthesize data for this review following the three steps outlined by

Mays and coworkers (2005). Initially, data extraction tables for each research question were developed for preliminary analysis. More detailed relationships between findings were then explored. Finally, the overall impact of the synthesis produced was considered for each research question. Thematic analyses were conducted (for each research question) for the included qualitative studies. This involved organization of data into descriptive and analytic themes, as described by Barnett-Page and Thomas (2009), to explore the need, appropriateness, and effectiveness of ACP for this population.

## RESULTS

### Study Selection

The search strategy produced 422 results. After duplicates were removed, 211 studies were screened with careful consideration for eligibility criteria, and 195 studies were excluded (see Figure 1 for further details of the selection process). Following this, 16 studies (12 quantitative and 4 qualitative) were deemed suitable for our review. Additional studies were not detected from the reference lists of eligible studies.



**Fig. 1.** Selection process for systematic review.

**Table 1.** Prevalence and predictors of ACP/AD for MND/ALS (studies ordered by quality rating)

Authors, Year, Country	Quality Rating	Design, Aim, Method	Sample and Setting	Results	Summary and Limitations
<b>Quantitative studies</b>					
Hossler et al. (2011), USA	91%	<b>Design:</b> Pilot study—intervention <b>Aim:</b> To explore effectiveness of a decision aid (interactive computer program) for ACP for people with ALS <b>Method:</b> Pre/post-intervention questionnaires	<b>Sample:</b> $n = 17$ ALS patients. Mean age = 60.6. Mean duration of disease = 44 months <b>Setting:</b> single institution, Pennsylvania	35% had heard “a lot” and 41% “a fair amount” about ACP or living wills Some form of AD completed by 67% of ALS patients; 80% had a power of attorney	Some form of AD completed by 67% of ALS patients and 80% had a power of attorney Small sample at single institution. No data on nonparticipants
Albert et al. (1999), USA	81%	<b>Design:</b> Longitudinal cohort study <b>Aim:</b> To understand palliative care choices of ALS patients <b>Method:</b> Patients interviewed at baseline (diagnosis) and every 4 months, for a median of 12 months	<b>Sample:</b> $n = 121$ ALS patients, 79% diagnosed in prior 12 months, 21% diagnosed for > 12 months; mean age 59.7, 61% male <b>Setting:</b> Single ALS/MND clinic in NY	At baseline, 28% of patients diagnosed within last 12 months had completed a healthcare proxy, 4% a living will, 11% a power of attorney and 4% a DNR chart. At last follow-up, 63% of patients had completed a healthcare proxy, 15% a living will, 43% a power of attorney, and 10% a DNR chart. All differences were significant ( $p < 0.001$ ). 25% of patients had not planned for death in any way (no ADs or legal preparation) Living patients in recently diagnosed group less likely to have completed a healthcare proxy (49 versus 76% for deceased patients, $p < 0.01$ ) and DNR charts (0 vs. 18% for deceased patients, $p < 0.01$ ). Differences between healthcare directive completion rates for recently diagnosed versus long-term patients not observed	Significant differences observed in utilization of ADs from baseline to last follow-up Patients who had died prior to follow-up more likely to have completed healthcare proxy or DNR chart (but not a living will or power of attorney) Single-institution study. Relies on time from diagnosis as baseline rather than symptom onset

Continued

Table 1. Continued

Authors, Year, Country	Quality Rating	Design, Aim, Method	Sample and Setting	Results	Summary and Limitations
Astrow et al. (2008), USA	77%	<b>Design:</b> Longitudinal cohort study <b>Aim:</b> To explore documentation and adherence to DNR orders. To compare cancer and ALS settings <b>Method:</b> Patient interviews and medical record review within 8 weeks of diagnosis (baseline) and after 3 and 6 months (for follow-up)	<b>Sample:</b> $n = 32$ ALS patients: expected 2-year survival less than 50%; mean age 62.4, 56% male <b>Setting:</b> Medical institutions in Baltimore and Manhattan	Completed documented discussion of: ventilator support by 3 months (31%) and at 6 months (56%); artificial nutrition and hydration (ANH) by 3 months (38%) and at 6 months (56%); DNR by 3 months (25%) and at 6 months (41%). A follow-up study with family members of deceased patients ( $n = 7$ ) found all but 1 patient (86%) had DNR orders prior to death, and these were honored in all cases	The majority of patients had DNR orders in place prior to death. Small sample from single geographical area; possibility of incomplete data due to methodology
Bradley et al. (2001), USA	77%	<b>Design:</b> Cross-sectional <b>Aim:</b> To compare the management of patients with ALS with relevant practice parameters <b>Method:</b> Analysis of completion data	<b>Sample:</b> $n = 373$ deceased (of 2018) ALS patients. Mean age: 58.9 years; 61% male <b>Setting:</b> Patients were enrolled in national ALS care database (USA)	ADs completed by 90% of patients	ADs completed by 90% of patients enrolled in the ALS care database North American management of ALS may not generalize to other world regions
Ganzini, et al. (2002), USA	77%	<b>Design:</b> Cross-sectional <b>Aim:</b> To study end-of-life experiences for ALS patients <b>Method:</b> Survey exploring end-of-life outcomes for ALS patients	<b>Sample:</b> $n = 50$ caregivers of deceased ALS patients (72% spouses); median time between patient death and caregiver survey of 36 months <b>Setting:</b> Two clinics in Oregon	ADs completed by 88% of patients; 86% had made living wills and 76% had a healthcare power of attorney) Patients whose primary goal was comfort more likely to stop ventilator support (69 vs. 17%, $p = 0.03$ ), compared with those whose primary goal was extending life	ADs completed by 88% of patients. End-of-life planning related to patient preferences/priorities. Single geographical location. Possibility of caregiver reporting biases. No data on nonparticipants
Miller et al. (2000), USA	72%	<b>Design:</b> Cross-sectional <b>Aim:</b> To evaluate and improve clinical practice for ALS <b>Method:</b> Observational study of temporal trends in ALS management	<b>Sample:</b> $n = 1,857$ ALS patients; mean age: 58.6 <b>Setting:</b> Patients enrolled on the ALS patient care database, across 83 clinical sites	ADs had been completed by 70% of (213) deceased patients	ADs completed by 70% of patients Observational data, limited to North American perspective

Continued

Table 1. Continued

Authors, Year, Country	Quality Rating	Design, Aim, Method	Sample and Setting	Results	Summary and Limitations
Moss et al. (1996), USA	72%	<b>Design:</b> Cross-sectional <b>Aim:</b> To examine ACP and outcomes for patients with ALS on long-term mechanical ventilation (LMTV) <b>Method:</b> Interviews and questionnaires with patients and caregivers/family members	<b>Sample:</b> $n = 50$ ALS patients receiving long-term mechanical ventilation (LTMV); mean age: 59, 68% male Mean duration of ALS: 71 months; mean duration of LMTV: 36 months	ADs had been completed by 79% of patients (96% wanted them). 42% made advance decisions to undergo LTMV when respiratory failure developed; 42% consented in an emergency situation; 16% did not personally consent (8% of these cases received family consent and 8% physician consent)	ADs completed by 79% of patients. Decisions for LTMV were made in advance for 42% of patients Potential interviewer bias. One third of identified patients not interviewed due to death, being “locked in,” or refusal; issues may have been minimized as a result
Munroe et al. (2007), USA	72%	<b>Design:</b> Cross-sectional <b>Aim:</b> To determine when end-of-life discussions with ALS patients occurred <b>Method:</b> Retrospective chart review of timing of end-of-life discussions	<b>Sample:</b> $n = 43$ consecutive patients (one excluded): 39–94 years <b>Setting:</b> Single neuromuscular clinic in Georgetown	60% of patients chose DNI/DNR orders after initial end-of-life discussion; 12% of patients after second visit; 10% were undecided; 14% lost to follow-up; 5% decided upon full ventilator support	Timing of end-of-life decision making, though frequently made early in disease trajectory, can be delayed for some patients Retrospective design. Stability of wishes not reported/ investigated.
Mandler et al. (2000), USA & Canada	68%	<b>Design:</b> Cross-sectional <b>Aim:</b> To study clinical parameters and end-of-life outcomes for ALS patients <b>Method:</b> Data analysis of large observational directory. Circumstances of death provided by family members/ caregivers (single-page form)	<b>Sample:</b> $n = 1014$ deceased ALS patients; median age (at death): 62 years <b>Setting:</b> Patients enrolled on the ALS patient care database’ caregivers & family members recruited via American and Canadian ALS multidisciplinary centers	ADs completed by 89% of patients.	ADs completed by 89% of patients Retrospective data collection; over 90% of patients treated in specialized multidisciplinary centers in the USA

Continued



Table 1. Continued

Authors, Year, Country	Quality Rating	Design, Aim, Method	Sample and Setting	Results	Summary and Limitations
Silverstein et al. (1991), USA	68%	<b>Design:</b> Longitudinal cohort study <b>Aim:</b> To identify wishes of patients with ALS and stability of wishes over time <b>Method:</b> Prospective survey questionnaire and structured interview; measurements conducted at baseline and at 6 months	<b>Sample:</b> 38 consecutive patients; mean age: 54, 66% male <b>Setting:</b> Patients recruited from one MND clinic in Chicago	47% had had prior discussion about life-sustaining care Differences of responses to two vignettes about CPR detected: for scenario 1 (development of severe pneumonia for which a breathing machine was required) 58% wanted CPR, 34% did not, and 8% gave other answers; for scenario 2 (in addition to severe pneumonia, irreversible memory loss developed), 22% wanted CPR and 78% did not	47% had had prior discussion about life-sustaining care Different scenarios appear to prompt different decisions for patients with respect to life-sustaining treatments Single-institution study
Qualitative studies					
Burchardi et al. (2005), Germany	90%	<b>Design:</b> Cross-sectional <b>Aim:</b> To explore how discussions of living wills are undertaken <b>Method:</b> Face-to-face semistructured interviews with patients and neurologists	<b>Sample:</b> Neurologists: $n = 15$ (mean age: 39, 80% male); ALS patients: $n = 15$ (mean age: 59, 67% male) <b>Setting:</b> Institutions in Erlangen and Wuerzburg	40% of patients had completed a living will; 27% intended to, and 33% did not wish to	40% had completed a living will Small sample in one geographic region (northern Bavaria)
Ray et al. (2010), UK & Australia	60%	<b>Design:</b> Cross-sectional <b>Aim:</b> To examine end-of-life experiences of caregivers of persons with MND and identify opportunities for better practice <b>Method:</b> Secondary analysis of two longitudinal datasets, featuring interviews & observational data	<b>Sample:</b> 13 family caregivers who discussed death/dying (male to female ratio for patients of 1.4:1) <b>Setting:</b> Primary study recruited via MND associations in UK and Australia	All caregivers reported discussion of care and acceptance/rejection of specific symptom management; 15% had completed NFR orders and 15% ACPs	15% had completed NFR orders and 15% ACP Small sample, precluding non-English speakers

**Table 2.** Optimal timing, content, and format of discussion and documentation process

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
<b>Qualitative studies</b>					
Albert et al. (1999), USA	81%	<b>Design:</b> Longitudinal cohort study <b>Aim:</b> To understand palliative care choices of ALS patients <b>Method:</b> Patients interviewed at baseline (diagnosis) and every 4 months, for a median of 12 months	<b>Sample:</b> $n = 121$ ALS patients: 79% diagnosed in prior 12 months; 21% diagnosed for >12 months; mean age 59.7, 61% male <b>Setting:</b> Single ALS/MND clinic in NY	At baseline, 28% of patients diagnosed within last 12 months had completed a healthcare proxy, 4% a living will, 11% a power of attorney, and 4% a DNR chart. At last follow-up, 63% of patients had completed a healthcare proxy, 15% a living will, 43% a power of attorney, and 10% a DNR chart. All differences significant ( $p < 0.001$ ) Differences between healthcare directive (HCD) completion rates for recently diagnosed versus long-term patients not observed	Uptake of ACP evidently increases with time/disease progression. However, lack of difference in HCD rates for recently diagnosed and longer-term patients may indicate that some delay in planning is typical in the earlier stages of the disease Single-institution study; relies on time from diagnosis as baseline rather than symptom onset
Astrow et al. (2008), USA	77%	<b>Design:</b> Longitudinal cohort study <b>Aim:</b> To explore documentation and adherence to DNR orders; to compare cancer and ALS settings <b>Method:</b> Patient interviews and medical record review within 8 weeks of diagnosis (baseline) and after 3 and 6 months (for follow-up)	<b>Sample:</b> $n = 32$ ALS patients: expected 2-year survival less than 50%; mean age 62.4, 56% male <b>Setting:</b> Medical institutions in Baltimore and Manhattan	Completed documented discussion of: ventilator support by 3 months (31%) and at 6 months (56%); ANH by 3 months (38%) and at 6 months (56%); DNR by 3 months (25%) and at 6 months (41%)	Uptake of documented discussion of healthcare options shown to increase with time/disease progression Small sample from single geographical area; possibility of incomplete data due to methodology
Ganzini et al. (2002), USA	77%	<b>Design:</b> Cross-sectional <b>Aim:</b> To study end-of-life experiences for ALS patients <b>Method:</b> Survey exploring end-of-life outcomes for ALS patients	<b>Sample:</b> $n = 50$ caregivers of deceased ALS patients (72% spouses); median time between patient death and caregiver survey: 36 months <b>Setting:</b> Two clinics in Oregon	86% had made living wills and 76% had a healthcare power of attorney	86% had made living wills and 76% had a healthcare power of attorney Single geographical location; possibility of caregiver reporting biases; no data on nonparticipants

Continued



Table 2. Continued

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
Dreyer et al. (2011), Denmark	72%	<b>Design:</b> Cross-sectional <b>Aim:</b> To describe medical and patient-related aspects of terminating IHMV <b>Method:</b> Retrospective descriptive analysis of patient-related aspects of terminating invasive home mechanical ventilation (IHMV)	<b>Sample:</b> 12 ALS patients who had initiated and decided to withdraw IHMV; median age 61 years, 67% male <b>Setting:</b> Single respiratory centre in Denmark	ADs for end-of-life care (especially withdrawal of treatment) discussed prior to initiating IHMV Informed consent to withdraw IHMV given in advance for all patients, should they develop a totally locked-in state (TLS)	ADs for end-of-life care discussed prior to initiating IHMV; informed consent to withdraw IHMV given in advance for all patients, should they develop a totally locked-in state (TLS) Small sample in a single location
Moss et al. (1996), USA	72%	<b>Design:</b> Cross-sectional <b>Aim:</b> To examine ACP and outcomes for patients with ALS on long-term mechanical ventilation (LMTV) <b>Method:</b> Interviews and questionnaires conducted with ALS patients and caregivers/ family members	<b>Sample:</b> $n = 50$ ALS patients receiving long-term mechanical ventilation (LTMV); mean age 59, 68% male Mean duration of ALS: 71 months; mean duration of LMTV: 36 months	Of the patients who had completed ADs, 8% had done so prior to ALS diagnosis; 45% after diagnosis (but before initiating LTMV); 47% after starting LTMV Most patients (76%) reported wanting to stop LTMV under certain circumstances: permanent unconsciousness (68%); inability to communicate (42%); burdensome to family (24%); no caregiver help (24%); insufficient funds (18%); loss of insurance (16%) Written specifications for LTMV included in AD for 66% of patients; more than half (58%) of patients would not want CPR Patients also more likely to have expressed their preferences about LTMV and CPR to family members than to their physicians	ADs often not made “in advance” but by necessity (e.g., when a medical crisis occurred) 76% of patients wished to stop LTMV under certain circumstances and 66% of patients had documented their specifications in their ADs Potential interviewer bias; one third of identified patients not interviewed due to death, being “locked in,” or refusal; issues may have been minimized as a result
Munroe et al. (2007), USA	72%	<b>Design:</b> Cross-sectional <b>Aim:</b> To determine when end-of-life discussions with ALS patients occurred <b>Method:</b> Retrospective chart review of timing of end-of-life discussions	<b>Sample:</b> $n = 43$ consecutive patients (one excluded): 39–94 years <b>Setting:</b> Single neuromuscular clinic in Georgetown	End-of-life issues instigated at first pulmonary visit for 40 (95%) patients; 25 (60%) patients chose DNI/DNR orders after initial end-of-life discussion; 5 (12%) patients after second visit; 4 (10%) were undecided; 6 (14%) lost to follow-up; 2 (5%) decided upon full ventilator support Median decision time was 6 months (range 0–9 months); decision making not related to level of lung or bulbar function	Median decision time was 6 months (range 0–9 months). Retrospective design. Stability of wishes not reported/investigated

Continued

Table 2. Continued

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
Silverstein et al. (1991), USA	68%	<b>Design:</b> Longitudinal cohort study <b>Aim:</b> To identify wishes of patients with ALS and stability of wishes over time <b>Method:</b> Prospective survey questionnaire and structured interview; measurements conducted at baseline and at 6 months	<b>Sample:</b> 38 consecutive patients; mean age 54, 66% male <b>Setting:</b> Patients recruited from one MND Clinic in Chicago	Instability of responses to CPR vignettes detected from baseline to 6 months: 5 patients who initially wanted CPR for scenario; 1 later decided against it and 3 patients who initially did not want CPR later decided that they would ( $\kappa = 0.23$ ); 5 patients changed their responses to the second scenario ( $\kappa = 0.31$ )	Instability of patient responses (to vignettes) detected, with respect to wishes for life-sustaining care Single-institution study
Qualitative studies					
Burchardi et al. (2005), Germany	90%	<b>Design:</b> Cross-sectional <b>Aim:</b> To explore how discussions of living wills are undertaken <b>Method:</b> Face-to-face semistructured interviews to with patients and neurologists	<b>Sample:</b> Neurologists: $n = 15$ (mean age 39, 80% male); ALS patients: $n = 15$ (mean age 59, 67% male) <b>Setting:</b> Institutions in Erlangen and Wuerzburg	Patients reported purpose of living wills was to refuse unwanted life-sustaining treatment; majority of patients did not wish to discuss living wills with their doctors, as it was contrary to their life-sustaining roles; some completed living wills on their own, others in consultation with family; standard forms were typically used and most considered disease-specific preferences unnecessary; they waited for symptoms to emerge before making decisions about life-sustaining treatments Physicians reported early discussion of living wills was unsuitable (too confronting for patients and troubling for doctors) and should be initiated after disease progresses and respiratory symptoms emerge; physicians felt that only persons in advanced stages of the disease can accept death in real and stable terms	Purpose of living wills perceived to be to refuse life-sustaining treatment; both patients and doctors preferred to delay discussion and decisions about end-of-life issues. Necessary/appropriate timing considered to be in advance stages of disease (i.e., when respiratory failure occurs) Small sample in one geographic region (northern Bavaria)

Continued

Table 2. Continued

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
Preston et al. (2011), UK	65%	<p><b>Design:</b> Cross-sectional</p> <p><b>Aim:</b> To investigate bereaved relatives' experiences of the preferred priorities for care (PPC) document</p> <p><b>Method:</b> Face-to-face semistructured interviews investigating bereaved relatives' experience of the preferred priorities for care (PPC) document</p>	<p><b>Sample:</b> 11 family members (mean age: 65) of deceased MND patients who had completed a preferred priorities for care (PPC) document and had died at least 3 months prior to study commencement</p> <p><b>Setting:</b> Participants identified through an MND center in northwest England</p>	<p>PPC completion ranged from 2 to 17 months prior to death, and earlier completion was considered optimal.</p> <p>Several participants felt it was important that patients were still able to talk and write (to sign the document) during the completion process</p>	<p>PPC completion ranged from 2 to 17 months prior to death, and earlier completion was considered optimal</p> <p>Small sample form single institution.</p> <p>Potential gender bias due to predominantly male caregiver sample (atypical)</p>

## Study Characteristics

Systematic quality scoring determined that four studies (25%) were given scores of 90% or above, four (25%) received scores between 75 and 89%, and eight (50%) between 60 and 74%. The majority of studies (63%) were conducted in the United States. Other studies took place in Europe, and one study featured participants from the United Kingdom and Australia. Nine studies (56%) were published during the previous decade, and the remaining studies were published between 1991 and 2002.

## Synthesis of Results

### Prevalence and Predictors

Prevalence rates for some form of AD or ACP, or prior discussion of life-sustaining care, were reported in 10 quantitative studies and 2 qualitative studies (numbers ranged from 15 to 90%; see Table 1). Quantitative studies reporting higher rates (70–90%) of ADs (Bradley et al., 2001; Ganzini et al., 2002; Mandler et al., 2001; Miller et al., 2000) were primarily conducted in the United States, where all hospitals that receive federal funding are obliged to ask patients about ADs (Mandler et al., 2001).

Differences in reported rates may also be explained by temporal differences in data collection, as rates of completion were shown to increase with disease progression. This is demonstrated by two longitudinal studies. One (Albert et al., 1999) followed 121 ALS patients diagnosed within the previous 12 months every 4 months (for 12 months), finding that on first follow-up 28% of patients had completed a healthcare proxy, 4% a living will, 11% a power of attorney, and 4% a “do-not-resuscitate” (DNR) chart. At last follow-up, 63% of patients had completed a healthcare proxy, 15% a living will, 43% a power of attorney, and 10% a DNR chart (all differences were significant,  $p < 0.001$ ). Similarly, Astrow et al. (2008) reported that documented discussion of ventilator support by three months (31%) was less than at six months (56%). Notably, one study (Albert et al., 1999) found that being alive versus being deceased predicted DNR rate while time since diagnosis did not, suggesting that declining health rather than time since diagnosis motivates ACP completion.

Three studies explored predictors of ACP. An individual's goals for end-of-life care and specific clinical circumstances also appear to influence decision making about life-sustaining treatments. For example, a study by Ganzini et al. (2002) in 50 caregivers reported that patients whose primary care goal was comfort were more likely to stop ventilator support than those whose primary care goal was extending life (69 versus 17%,  $p = 0.03$ ). Silverstein et al. (1991) reported

**Table 3.** Perceived benefits of ACP for patients and caregivers

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
Qualitative studies					
Silverstein et al. (1991), USA	68%	<b>Design:</b> Longitudinal cohort study <b>Aim:</b> To identify wishes of patients with ALS and stability of wishes over time <b>Method:</b> Prospective survey questionnaire and structured interview; measurements conducted at baseline and at 6 months	<b>Sample:</b> 38 consecutive patients; mean age 54, 66% male <b>Setting:</b> Patients recruited from one MND Clinic in Chicago	Discussion of mechanical ventilation and other life-sustaining therapies provoked some sadness and anxiety, but also feelings of being “cared for” relieved and “in control”	End-of-life discussions helped patients attain some positive feelings Single-institution study
Qualitative studies					
Burchardi et al. (2005), Germany	90%	<b>Design:</b> Cross-sectional <b>Aim:</b> To explore how discussions of living wills are undertaken <b>Method:</b> Face-to-face semistructured interviews to with patients and neurologists	<b>Sample:</b> Neurologists: $n = 15$ (mean age 39, 80% male); ALS patients: $n = 15$ (mean age 59, 67% male) <b>Setting:</b> Institutions in Erlangen and Wuerzberg	Patients reported living wills to be important/necessary to prevent unwanted treatments; however, they closely associated them with death and loss of hope <b>Themes:</b> Loss of hope emerged as a dominant theme for patients and physicians; limiting early information exchange about living wills/future care and the promotion of “wait-and-see” strategies	Patients reported living wills to be important/necessary to prevent unwanted treatments Small sample in one geographic region (northern Bavaria)
Whitehead et al. (2011), UK	90%	<b>Design:</b> Cross-sectional <b>Aim:</b> To explore end-of-life experiences of people with MND and current and bereaved care-givers <b>Method:</b> Narrative interviews	<b>Sample:</b> 24 MND patients (mean age 63.4, 67% female); 28 current caregivers (61% male) and former caregivers (70% female). Mean disease duration: 23 months; mean time since bereavement (former caregivers) of 31 months. <b>Setting:</b> MND care and research center, northwest England	Use of ACP tools beneficial for patients and caregivers for clarifying patient choices and informing others Clarification of patients’ thoughts and preferences for future care seen as invaluable for voicing people’s wishes, whether documented in a PPC/ACP or informally discussed with an HCP <b>Themes:</b> Anxieties; end-of-life decision making, and ACP; services at the end-of-life stage; impact on caregivers; euthanasia	Advance plans and discussions viewed as beneficial for clarifying and communicating decisions about end-of-life care Single-location study; some interviews conducted with both patients and caregivers present; rates of AD/ACP completion not given

Continued

Table 3. Continued

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
Preston et al. (2011), UK	65%	<p><b>Design:</b> Cross-sectional</p> <p><b>Aim:</b> To investigate bereaved relatives' experiences of the preferred priorities for care (PPC) document</p> <p><b>Method:</b> Face-to-face semistructured interviews</p>	<p><b>Sample:</b> 11 family members (mean age 65) of deceased MND patients who had completed a preferred priorities for care (PPC) document and had died at least 3 months prior to study commencement.</p> <p><b>Setting:</b> Participants identified through an MND center in northwest England</p>	<p>Overall, completing a PPC was perceived positively, though most found it emotionally difficult. Benefits included providing "peace of mind" and a sense of relief for patients, prompting discussions of specific issues between family members, e.g., resuscitation and helping to increase HCPs' awareness of patient wishes</p> <p>PPC seen to be most beneficial in cases where family members and patients were less in agreement about end-of-life decisions.</p> <p>Awareness of patients' wishes seen as more influential than PPC on end-of life experiences</p> <p><b>Themes:</b> Completion; document availability to others; importance and influence on end-of-life experience; limitations</p>	<p>Overall, PPC completion was viewed as beneficial; providing peace of mind for patients, initiating family discussion and raising HCP awareness</p> <p>Small sample from single institution.</p> <p>Potential gender bias due to predominantly male caregiver sample (atypical)</p>
Ray et al. (2010 < UK & Australia	60%	<p><b>Design:</b> Cross-sectional</p> <p><b>Aim:</b> To examine end-of-life experiences of caregivers of persons with MND and identify opportunities for better practice</p> <p><b>Method:</b> Secondary analysis of two longitudinal datasets, featuring interviews &amp; observational data</p>	<p><b>Sample:</b> 13 family caregivers who discussed death/dying (male-to-female ratio for patients of 1.4:1)</p> <p><b>Setting:</b> Primary study recruited via MND associations in UK and Australia</p>	<p>ACP (or specific discussions about death) enabled greater sense of control and dignity for patients and eased bereavement process for caregivers.</p> <p>ACP instigation and effectiveness diminished by patients or caregiver reluctance to discuss end-of-life issues, due to association with lack of hope; HCP misunderstanding and misuse of ADs also problematic</p> <p><b>Themes:</b> Planning for end of life; unexpected dying, dignity in the dying body; positive end to MND</p>	<p>Open communication about death and ACPs beneficial for patients and caregivers</p> <p>Small sample, precluding non-English speakers</p>

**Table 4.** *HCPs' awareness/acceptance of ACP*

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
Qualitative studies					
Perretti-Watel et al. (2008), France	100%	<b>Design:</b> Cross-sectional <b>Aim:</b> To assess district nurses' attitudes toward terminally ill patients' autonomy <b>Method:</b> Participants randomly sampled to complete telephone survey based on a clinical case; ALS patient has respiratory failure	<b>Sample:</b> $n = 601$ (75% female) French district nurses, currently delivering home care, with at least one-year experience. <b>Setting:</b> National survey, France	22% routinely discussed end-of-life issues with terminally ill patients; 19% stated patients should always be told the prognosis of their disease and 43% only at the patient's request; 9% thought patients should never be asked to make a living will 44% reported that an ALS patient with respiratory failure should always be intubated (53% for F patient & 40% for M patient, $p < 0.01$ ); 27% upheld tracheotomy without considering patient consent necessary (39% among M nurses and 30% among F, $p < 0.05$ ) Systematic tracheostomy (i.e., without patient consent) was more frequently upheld by nurses who never/rarely discussed end-of-life issues with terminally ill patients (multivariate $OR = 1.8$ ; 90% $CI = 1.1-2.7$ ), and those who considered patients should never be asked to make a living will (multivariate $OR = 4.0$ ; 90% $CI = 2.4-6.8$ )	The majority of nurses reported not routinely discussing prognosis or involving patients in end-of-life decision making Responses to the clinical case revealed that many nurses were prepared to administer life-sustaining interventions without considering patient consent Closed-end questionnaire, investigating attitudes not practice. Case study involved hospital setting, but sampled home-based nurses
Qualitative studies					
Burchardi et al. (2005), Germany	90%	<b>Design:</b> Cross-sectional <b>Aim:</b> To explore how discussions of living wills are undertaken <b>Method:</b> Face-to-face semistructured interviews with patients and neurologists	<b>Sample:</b> Neurologists: $n = 15$ (mean age 39, 80% male); ALS patients: $n = 15$ (mean age 59, 67% male) <b>Setting:</b> Institutions in Erlangen and Wuerzburg	Physicians reported living wills provided assistance with medical decision making and felt them important for preventing life-sustaining treatments, which would lead to lives of questionable quality for terminally ill patients Physicians closely associated living wills with death and did not routinely discuss them with patients; they waited for the disease to advance (e.g., respiratory failure to occur) before discussing life-sustaining treatments; this is when they deemed patients capable of making such decisions <b>Themes:</b> Loss of hope emerged as a dominant theme for patients and physicians; limiting early information exchange about living wills/ future care and promoting "wait-and-see" strategies	Physicians reported living wills provided assistance with medical decision making, associated them closely with death, and waited for symptoms to progress before discussing options in relation to life-sustaining treatments Small sample in one geographic region (northern Bavaria)

Continued



Table 4. Continued

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Results	Summary and Limitations
Whitehead et al. (2011), UK	90%	<b>Design:</b> Cross-sectional <b>Aim:</b> To explore end-of-life experiences of people with MND and current and bereaved caregivers <b>Method:</b> Narrative interviews	<b>Sample:</b> 24 MND patients (mean age 63.4, 67% female); 28 current caregivers (61% male) and former caregivers (70% female). Mean disease duration 23 months; mean time since bereavement (former caregivers) 31 months. <b>Setting:</b> MND care and research center, northwest England	Limited understanding of ACP demonstrated by HCPs; furthermore, some reported that patient preferences were not always being honored <b>Themes:</b> Anxieties; end-of-life decision making and ACP; services at end-of-life stage; impact on caregivers; euthanasia	Limited HCP knowledge and appreciation for ACP evident Single-location study; some interviews conducted with both patients and caregivers present Rates of AD/ACP completion not given
Preston et al. (2011), UK	65%	<b>Design:</b> Cross-sectional <b>Aim:</b> To investigate bereaved relatives' experiences of the preferred priorities for care (PPC) document <b>Method:</b> Face-to-face semistructured interviews	<b>Sample:</b> 11 family members (mean age 65) of deceased MND patients who had completed a preferred priorities for care (PPC) document and had died at least 3 months prior to study commencement <b>Setting:</b> Participants identified through an MND center in northwest England	Family members reported that a major limitation of the effectiveness of PPC documents was a lack of awareness among HCPs, especially in hospitals. Some staff appeared to misunderstand the purpose of the documents; others appeared to ignore patients' stated wishes and preferences <b>Themes:</b> Completion; document availability to others; importance and influence on end-of-life experience; limitations	Lack of understanding/awareness of the PPC document among HCPs seems to limit its efficacy Small sample from single institution. Potential gender bias due to predominantly male caregiver sample (atypical).

that patients were more likely to state a preference for CPR in response to vignettes with less serious symptoms and functional loss.

#### *Optimal Timing, Content, and Format of Discussion and Documentation Process*

Most studies have explored *when* an AD or ACP is completed, as opposed to the *ideal time* to complete one. Timing was reported in six quantitative and two qualitative studies (see Table 2). As noted above, completion rates of ADs/ACP increased with disease progression (Albert et al., 1999; Astrow et al., 2008). One German qualitative study by Burchardi and colleagues (2005) found that both patients and physicians closely associated living wills with death and tended to wait for serious symptoms to emerge before making decisions about life-sustaining treatments. Patients felt it inappropriate to discuss refusal of unwanted life-sustaining treatments (the purpose of living wills) with physicians, as they considered this contrary to doctors' life-sustaining roles (Burchardi et al., 2005). Physicians reported that early discussion of living wills was unsuitable, as it would be too confronting for both patients and doctors. They felt that only persons in the advanced stages of illness could accept death in real and stable terms (Burchardi et al., 2005).

An alternative perspective is provided by several studies which reported that earlier AD/ACP completion was preferable. One qualitative UK study (Preston et al., 2012) with 11 family members who had used a "preferred priorities for care" (PPC) document reported that completion ranged from 2 to 17 months prior to death and that earlier completion was considered optimal (Preston et al., 2012). For instance, several participants in this study felt it important that patients be actively involved in the completion process and be able to talk about and sign their own documents. Earlier completion was achieved in at least one quantitative study (Munroe et al., 2007), where end-of-life issues were discussed at the first pulmonary visit for 95% patients, with 60% of patients choosing DNR/DNI ("do-not-intubate") orders at that time.

The stability of patient wishes may represent an important issue relevant to ACP timing. Though generally underreported in the literature, stability of wishes was examined in one quantitative study by Silverstein et al. (1991). These investigators documented instability of responses to two CPR vignettes (from baseline to 6 months), with 20 to 30% of patients changing their responses to the two scenarios.

Content and format issues were discussed in five quantitative studies (Albert et al., 1999; Astrow et al., 2008; Ganzini et al., 2002; Munroe et al., 2007) and three qualitative studies (Burchardi

et al., 2005; Preston et al., 2012; Whitehead et al., 2012), all of which focused on *typical* rather than *optimal* presentation of ADs/ACP. Disease-specific preferences for life-sustaining treatments were common—such as DNI, DNR, or ANH ("artificial nutrition and hydration") orders (Albert et al., 1999; Astrow et al., 2008; Munroe et al., 2007). The PPC document utilized by patients in two UK studies (Preston et al., 2012; Whitehead et al., 2012) was designed to assist patients achieve palliative care goals, particularly their preferred place of death. Living wills, healthcare proxies, and powers of attorneys were also utilized (Albert et al., 1999; Ganzini et al., 2002). Where life-sustaining interventions were already in place, a patient's AD might specify the conditions under which they wished invasive procedures to cease. For example, in a Danish study (Dreyer et al., 2012) with 12 ALS patients who had initiated home mechanical ventilation (IHMV), all patients specified withdrawal of IHMV should they develop a totally "locked-in" state.

#### *Perceived Benefits of ACP for Patients and Caregivers*

The benefits of ADs/ACP were examined in one quantitative and four qualitative studies (see Table 3). The evidence from these samples suggests that, despite the emotional challenges inherent in discussing or documenting decisions for future care (Preston et al., 2012; Silverstein et al., 1991), several positive outcomes emerged, including prevention of unwanted life-sustaining treatments (Burchardi et al., 2005); stronger feelings of being "cared for" and "in control," thereby providing greater "peace of mind" and "a sense of relief" (Preston et al., 2012; Ray et al., 2012; Silverstein et al., 1991); generation of specific discussions between patients and caregivers that clarified patients' choices and raised awareness among family members (Preston et al., 2012; Whitehead et al., 2012); and increased patient dignity and an easier bereavement process for caregivers (Ray et al., 2012). Some patients and caregivers avoided discussion or documentation of end-of-life care, as they were inextricably linked with death and loss of hope (Burchardi et al., 2005; Ray et al., 2012).

#### *HCP Awareness/Acceptance of ACP*

The knowledge of HCPs and their attitudes toward ACP were examined in one quantitative and three qualitative studies (see Table 4). Two qualitative UK studies (Preston et al., 2012; Whitehead et al., 2012) found a limited understanding of ACP among HCPs, diminishing the effectiveness of ACP documents and sometimes resulting in medical intervention contrary to patients' stated wishes. In one

**Table 5.** Evidence of the impact of ACP on key outcomes

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Outcome Measurement and Results	Summary and Limitations
<b>Qualitative studies</b>					
Hossler et al. (2011), USA	91%	<b>Design:</b> Pilot study–intervention <b>Method:</b> Pre/post-intervention questionnaires, to explore effectiveness of a decision aid (interactive computer program) for ACP	<b>Sample:</b> $n = 17$ ALS patients. Mean age 60.6; mean duration of disease 44 months <b>Setting:</b> single institution, Pennsylvania	Satisfaction with ACP measured post intervention (15-item instrument) The perceived accuracy of ADs generated by program, reflecting patients' wishes regarding end-of-life care, was high (mean = $8.6 \pm 0.27$ ; 1 = not at all accurate, 10 = extremely accurate)	The program appeared to help patients generate efficacious ACPs Small sample at single institution; no data on nonparticipants
Astrow et al. (2008), USA	77%	<b>Design:</b> Longitudinal cohort study <b>Method:</b> Patient interviews and medical record review within 8 weeks of diagnosis (baseline) and after 3 and 6 months (for follow-up).	<b>Sample:</b> $n = 32$ ALS patients; expected 2-year survival less than 50%. Mean age 62.4, 56% male <b>Setting:</b> Medical institutions in Baltimore and Manhattan	Noted documentation of DNR preferences in medical records. Follow-up (telephone) interviews conducted with next of kin six weeks after patient's death to determine end-of-life decisions made A follow-up study with family members found that DNR orders were followed in all cases	DNR orders followed in all cases Small sample from single geographical area; possibility of incomplete data due to methodology
Bradley et al. (2001), USA	77%	<b>Design:</b> Cross-sectional <b>Method:</b> Analysis of completion data via university-based coordinating centre	<b>Sample:</b> $n = 373$ deceased (of 2018) ALS patients. Mean age 58.9 years, 61% male <b>Setting:</b> Patients were enrolled in national ALS care database	Data on ADs and circumstances of death reported by caregivers following patient's death ADs completed by 90% of patients; ADs followed in 97% of cases	ADs followed in the majority of cases North American management of ALS may not generalize to other world regions
Ganzini et al. (2002), USA	77%	<b>Design:</b> Cross-sectional <b>Method:</b> Survey exploring end-of-life outcomes for ALS patients	<b>Sample:</b> $n = 50$ caregivers of deceased ALS patients (72% spouses). Median time between patient death and caregiver survey 36 months <b>Setting:</b> Two clinics in Oregon	Data on ADs and circumstances of death reported by caregivers in survey ADs completed by 88% of patients; ADs followed in 88% of cases; 50% reported ADs to be helpful; 50% felt they had no effect on care Of the four patients who received CPR, two received it despite their primary goal of care being to relieve pain and discomfort even if it meant shortening life	ADs followed in 88% of cases; 50% felt they positively impacted upon end-of-life care Evidence detected of some patients receiving life-sustaining interventions, contrary to their goals of care Single geographical location; possibility of caregiver reporting biases (note median time since patient death 3 years). No data on nonparticipants

Continued

Table 5. Continued

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Outcome Measurement and Results	Summary and Limitations
Moss et al. (1996), USA	72%	<b>Design:</b> Cross-sectional <b>Method:</b> Interviews and questionnaires conducted with ALS patients and caregivers/family members	<b>Sample:</b> $n = 50$ ALS patients receiving long-term mechanical ventilation (LTMV). Mean age 59, 68% male Mean duration of ALS 71 months; mean duration of LMTV 36 months	Patients answered questions about ADs and care preferences in structured interviews Of the patients wishing to stop LTMV under certain circumstances, those who had written ADs were more likely to have verbally informed family members and physicians of their wishes, compared with those without written ADs (22/29 vs. 2/7, $p = 0.05$ )	Patients with written ADs also more likely to verbally communicate their wishes Potential interviewer bias. One third of identified patients not interviewed due to death, being "locked in," or refusal; issues may have been minimized as a result
Mandler et al. (2001), USA & Canada	68%	<b>Design:</b> Cross-sectional <b>Method:</b> Data analysis of large observational directory Circumstances of death provided by family members/caregivers (single-page form)	<b>Sample:</b> $n = 1,014$ deceased ALS patients. Median age (at death): 62 years <b>Setting:</b> Patients enrolled on the ALS patient care database Caregivers & family members recruited via American and Canadian ALS multidisciplinary centers	Data on ADs and circumstances of death reported by caregivers following a patient's death ADs completed by 89% of patients; ADs followed in 97% of cases	ADs followed in the majority of cases Retrospective data collection. Over 90% of patients treated in specialized multidisciplinary centers in the USA
Silverstein et al. (1991), USA	68%	<b>Design:</b> Longitudinal cohort study <b>Method:</b> Prospective survey questionnaire and structured interview. Measurements conducted at baseline and at 6 months	<b>Sample:</b> 38 consecutive patients. Mean age 54, 66% male <b>Setting:</b> Patients recruited from one MND Clinic in Chicago	Patients answered questions about ADs and care preferences in structured interviews Discussion of mechanical ventilation and other life-sustaining therapies provoked some sadness and anxiety, but also feelings of being "cared for," relieved, and "in control"	End-of-life discussions helped patients attain some positive feelings Single-institution study
Qualitative studies Whitehead et al. (2011), UK	90%	<b>Design:</b> Cross-sectional <b>Method:</b> Narrative interviews exploring end-of-life experiences of MND patients and current and bereaved caregivers	<b>Sample:</b> 24 MND patients (mean age 63.4, 67% female); 28 current caregivers (61% male) and former caregivers (70% female). Mean disease duration: 23 months; mean time since bereavement (former caregivers): 31 months <b>Setting:</b> MND care and research center, northwest England	Use of ACP tools beneficial for patients and caregivers for clarifying patient choices and informing others; however, limited understanding/utilization of ACPs is demonstrated by some HCPs (e.g., disregard of patient preferences during hospital admission)	ACP considered beneficial, but limited HCP knowledge/engagement limits document efficacy Single-location study. Some interviews conducted with both patients and caregivers present. Rates of AD/ACP completion not given

Continued

Table 5. Continued

Authors, Year, Country	Quality Rating	Design and Method	Sample and Setting	Outcome Measurement and Results	Summary and Limitations
Preston et al. (2011), UK	65%	<b>Design:</b> Cross-sectional <b>Method:</b> Face-to-face semistructured interviews investigating bereaved relatives' experience of the preferred priorities for care (PPC) document	<b>Sample:</b> 11 family members (mean age: 65) of deceased MND patients who had completed a preferred priorities for care (PPC) document and had died at least 3 months prior to study commencement. <b>Setting:</b> Participants identified through an MND center in northwest England	PPC document seen as important for providing "peace of mind" and a sense of relief for patients and prompting discussions of specific issues between family members. Despite this, many caregivers felt that the PPC document had little impact on end-of-life care, with awareness of patient's wishes seen as being more influential. Two participants reported negative experiences, in which patient's documents/wishes were being disregarded	Despite the benefits, PPC document was reported to have limited efficacy. Negative experiences associated with HCP's noncompliance. Small sample from single institution Potential gender bias due to predominantly male caregiver sample (atypical)
Ray et al. (2010), UK & Australia	60%	<b>Design:</b> Cross-sectional <b>Method:</b> Secondary analysis of two longitudinal datasets, featuring interviews & observational data	<b>Sample:</b> 13 family caregivers who discussed death/dying (male-to-female ratio for patients: 1.4:1) <b>Setting:</b> Primary study recruited via MND associations in UK and Australia	In cases where discussions about death had occurred, positive experiences were reported Problems arose when plans were not communicated effectively	Clear communication of care plans led to positive end-of-life outcomes Small sample, precluding non-English speakers



German qualitative study (Burchardi et al., 2005), physicians reported that living wills assisted medical decision making and prevented life-sustaining treatments for patients with severely impeded QoL. However, these physicians closely associated living wills with death and a loss of hope, and thus tended to delay end-of-life discussions until the disease had advanced considerably (e.g., respiratory failure had occurred). The majority of 601 district nurses in a French national survey (Peretti-Watel et al., 2008) did not routinely discuss prognosis or end-of-life issues with ALS patients, support living wills, or involve patients in end-of-life decision-making; in fact, 44% reported that they would perform intubation and 27% tracheostomy without considering patient consent (especially for women). These views were more common in male nurses.

### *Evidence of the Impact of ACP on Key Outcomes*

The impact of ACP was considered in seven quantitative and three qualitative studies (see Table 5). Four quantitative studies included follow-up with family members (Astrow et al., 2008; Bradley et al., 2001; Ganzini et al., 2002; Mandler et al., 2001), and patient preferences were reported to be honored in the majority (88–100%) of cases. Notably, all studies were conducted in the United States, and the data were collected retrospectively. The median time since patient death was three years for one study, and reporting biases were possible. Moreover, two studies utilized information from a national ALS database in more than 90% of patients treated in specialized multidisciplinary centers, so that the representativeness of these samples is uncertain. In contrast to these positive findings, in one U.S. study with 50 caregivers of deceased ALS patients, of the four patients reported to have received CPR, two received it despite their primary goal of care being “to relieve pain and discomfort even if it meant shortening life” (Ganzini et al., 2002).

Evidence from some qualitative studies suggests that patients’ wishes are sometimes miscommunicated or disregarded, resulting in negative experiences for patients and caregivers (Preston et al., 2012; Ray et al., 2012; Whitehead et al., 2012). Preston et al. (2012) suggested that family knowledge of preferences is more influential than ACP documents, though documentation processes were considered beneficial by many caregivers for clarifying patient wishes and generating family discussion (Preston et al., 2012; Whitehead et al., 2012). Evidence from one U.S. study with 50 ALS patients receiving LTMV (Moss et al., 1996) suggested that verbal discussion of end-of-life decisions was predicted by AD completion (22/29 vs. 2/7 for those who had not completed an AD).

Opportunities to ease the process of documentation and improve the accuracy of ADs may assist MND patients and family members to better prepare for disease advancement. In one study, an interactive computer program was developed as a decision aid for ACP and was piloted on a small sample of MND patients in the United States (Hossler et al., 2011). This program produced some promising preliminary results. Patients’ overall satisfaction with the decision aid was measured using a 15-item instrument, with a mean rating of  $4.2 \pm 0.16$  (1 = very dissatisfied, 5 = very satisfied). The perceived accuracy of the generated AD, as reflecting patients’ wishes, was a highly rated item, with a mean score of  $8.6 \pm 0.27$  (1 = not at all accurate, 10 = extremely accurate). Interventions such as these may be helpful to patients in the future.

### **DISCUSSION**

The prevalence of advance care planning varied considerably across studies, which may be explained by different timepoints for data collection as well as geographical factors. Recent trends toward patient-centered healthcare policy and shared decision making may be boosting prevalence figures in some regions, especially in America (Mandler et al., 2001; Salmond & David, 2005). By contrast, one UK-and-Australian-based qualitative study with caregivers of deceased relatives (Ray et al., 2012) reported relatively low prevalence rates for patients: 15% for NFR (“not-for-resuscitation”) charts and 15% for ACP. Reliance on caregiver reports and retrospective data collection, sometimes after a considerable time lapse (e.g., three-year median in Ganzini et al.’s (2002) study), raises reliability concerns for certain data. In relation to predictors of ACP, disease progression appears to be the strongest catalyst for AD completion, especially in cases characterized by rapid health decline. Personal healthcare goals and clinical circumstances are likely to influence end-of-life decisions as well, though further (quantitative and qualitative) evidence is required to substantiate the preliminary findings.

Relentless and rapid functional loss, typically associated with MND, compels consideration of optimal timing for ACP. The foregoing evidence suggests that many patients delay producing ADs until physical degeneration makes it necessary. However, it is difficult to compare studies due to methodological issues and the different temporal parameters. Earlier instigation of ACP may be beneficial for many patients and help them attain a greater sense of control. On the other hand, symptom progression may be necessary for some patients to accept the seriousness of their condition. According to clinical practice guidelines for



communicating prognosis and end-of-life decisions (Clayton, 2007), all patients with a progressive life-limiting illness should be given the opportunity to discuss their prognosis and end-of-life issues. However, patients should be able to defer discussion to a later time as well if they so desire. Instability of wishes was detected in one study documenting individuals' situational responses, which varied over a six-month period (Silverstein et al., 1991). Though these data were generated from a single institution with a relatively small sample, this may be an issue warranting further investigation. In practice, documented decisions might be periodically reviewed (perhaps every six months) to ensure better consistency over time (Silverstein, 1991).

The positive outcomes of ACP processes were perceived by several participants (patients and caregivers) from the included studies. Advance directives were frequently associated with feelings of control, relief, and "peace of mind" (Preston et al., 2012; Whitehead et al., 2012). However, contrary views were also reported. In one qualitative study with German patients (Burchardi et al., 2005), respondents linked living wills with death and diminished hope. Notably, most patients from this study held patriarchal views toward healthcare and felt that living wills were at odds with the physician's life-sustaining role.

Our review findings indicate that the efficacy of ADs may be compromised by HCPs' lack of awareness, personal/professional beliefs, and/or reluctance to discuss death (Burchardi et al., 2005; Peretti-Watel et al., 2008). Some patients received interventions contrary to their stated wishes, and a minority of HCPs demonstrated oppositional attitudes to ACP. Insufficient evidence is available for more comprehensive conclusions to be drawn.

Evidence from U.S.-based quantitative studies reporting very high rates of honored patient preferences (Astrow et al., 2008; Bradley et al., 2001; Ganzini et al., 2002; Mandler et al., 2001) stand at odds with qualitative evidence (from the United Kingdom and Australia) suggesting that patient wishes were often miscommunicated or disregarded (Preston et al., 2012; Ray et al., 2012; Whitehead et al., 2012). Health system differences may be impacting the results, as well as methodological limitations, including retrospective caregiver reports. Notwithstanding this, positive benefits were commonly reported for documentation processes, in order to clarify and communicate patient wishes. Written ADs may positively impact end-of-life outcomes either directly, via HCPs following these directives, or indirectly, by promoting meaningful family discussions (earlier on in the course of illness), following which family members may more confidently advocate patient wishes toward the end of life. Decision aids such as the interactive

computer program piloted by Hossler et al. (2011) may assist patients, caregivers, and HCPs in commencing this difficult decision-making process.

### Clinical Implications and Future Directions

Individual preferences should be considered when determining appropriate timing for initiating advance care planning. Raising awareness of the role and importance of ADs within (targeted) medical communities may increase the efficacy of ACP processes and the quality of end-of-life experiences for patients and families. Disease-specific decision aids may facilitate ACP processes and improve decisional accuracy (Hossler et al., 2011). Larger studies supporting preliminary findings for ACP are required to further examine efficacy. More qualitative evidence (including U.S. studies) and examining patients' or caregivers' experiences of AD completion and impact would also be advantageous. The stability of patients' wishes regarding future treatments is a most important topic that requires more rigorous investigation in future MND studies.

### LIMITATIONS

The scope and impact of our review was limited by the low number of relevant studies, which often compared nonrandomized groups and utilized diverse methodologies. Search strategies, though formulated in accordance with current research practices, may have missed relevant studies. All included studies were conducted in the context of Western cultures (Western Europe, North America, and Australia), and our findings may not reflect non-Western practices or experiences. Research questions were generated to investigate key elements of ACP but may not have captured all relevant information regarding ACP in MND.

### CONCLUSION

Accurate representation of ACP prevalence is indeterminate from our review, though advancing illness seems to predict AD completion. It is difficult to ascertain what constitutes optimal content, format, or timing with respect to completion or discussion of ADs/ACP in the MND setting. Although positive benefits are often associated with ACP, contrary views are reported. HCP's personal beliefs, lack of awareness, or reluctance to discuss death may be interfering with timely ACP processes. Notwithstanding this, varying patient preferences may make flexible ACP approaches and timing necessary. Utilization of ACP decision aids may increase the accuracy and clarity of patient choices and positively impact end-of-life outcomes.

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