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# Exploring the knowledge, attitudes, and practices of physical therapists in care facilities assisting individuals with Alzheimer's disease

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ABSTRACT

*Introduction:* Physical therapists (PTs) in nursing homes often treat patients with Alzheimer's disease. This study evaluated their knowledge, attitudes, and practices (KAP) concerning Alzheimer's care.
*Methods:* A KAP survey-based questionnaire was administered to PTs in Belgian nursing homes and long-term care facilities, focusing on their understanding of Alzheimer's, care approaches, and practical care aspects.
*Results:* The survey, completed by 133 PTs, revealed strong knowledge and positive attitudes. PTs adapted communication methods, managed treatment refusals, and prioritized fall prevention and safety. Care practices focused on maintaining patient autonomy through exercises for strength, balance, and coordination. Techniques like massage or aromatherapy were less commonly used, despite potential benefits. Notably, knowledge, experience, or exposure to Alzheimer's patients did not significantly influence attitudes or practices.
*Conclusion:* Targeted practical training in dementia care techniques is needed to enhance caregiving skills, despite a solid foundation in knowledge and attitudes. Future research should examine diverse samples and evaluate training impact on practices.


## Introduction

Alzheimer's disease (AD) is a form of dementia, a cognitive disorder that results in the deterioration of memory, cognitive function and the ability to perform activities of daily living. Specifically, AD is a pathological condition characterized by the progressive loss of synaptic connections and cortical atrophy due to the accumulation of phosphorylated tau and amyloid $\beta$ in the nervous system.[1] The heterogeneous nature of AD results in a wide variety of clinical presentations, ranging from asymptomatic protein accumulation to the progressive loss of autonomy observed in advanced stages of the disease. In the early stages, the manifestations of AD are dominated by memory impairment. Later progression involves the development of praxis disorders, anosognosia, motor restlessness, attention deficits and comprehension deficits, among other clinical manifestations.[2]

AD is the most common form of dementia worldwide, accounting for 60–70 % of all reported cases. According to the latest statistics from the World Health Organization, it is estimated that between 33 and 38.5 million individuals worldwide are grappling with the disease in 2023. Given that advanced age represents the most prominent risk factor for AD development, and with the aging trajectory of the population, this figure is projected to triple by the year 2050.[3,4] Worldwide, the prevalence of AD among individuals aged 60 years and older was reported to be 40.2 per 10,00.[5] In Europe, the frequency of AD in northern European countries is approximated at 4.31 % and the prevalence figures can be stratified across distinct age groups: 0.97 % for individuals aged 65–74, 7.66 % for those aged 75–84, and 22.53 % for individuals aged 85 years and older.[6] As indicated by the World Health Organization, AD and other forms of dementia rank seventh among the leading global causes of death. Furthermore, it was recognized as the second most prevalent cause of death in high-income countries in 2019.[7]

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AD is a progressive disease, and over time individuals may present with a more severe clinical presentation, requiring increased care and assistance with activities of daily living. Progression of the clinical condition may result in the placement of people with AD in nursing homes, which is associated with an increased risk of falls, delirium and several other adverse outcomes.[8] Therefore, healthcare professionals need to have a comprehensive knowledge of AD in order to formulate a personalized care plan tailored to the specific needs of the patient, thereby improving quality of life.

Physical therapists (PTs) are integral members of this multidisciplinary team in residential care facilities. Given their daily interaction with these patients and the significant number of residents with AD in nursing homes, it may be of interest to understand their knowledge, attitudes and practices (KAP) regarding their management of the disease. Indeed, conducting a KAP study with PTs caring for AD patients is crucial as it will assess their understanding of the disease, measure their attitudes towards patients and evaluate their actual care practices. This assessment may highlight areas of strength and areas for improvement, leading to targeted interventions and training programmes to improve the quality of care. Ultimately, the alignment of their knowledge, attitudes and practices may have a significant impact on patient outcomes and the overall quality of care for people with AD.

This study aims to comprehensively assess the KAP of PT working with AD patients in nursing homes. The KAP survey will explore possible relationships between their knowledge of AD, their attitudes towards people with AD and their care practices. The study proposes several hypotheses. Firstly, due to the perceived lack of training of healthcare staff in the management of AD, it is inferred that PT, as part of this workforce, may also have gaps in their knowledge of AD care. Secondly, negative perceptions and ageist attitudes towards AD may influence PT attitudes towards caring for people with AD. In addition, given the effectiveness of exercise therapy, including both general therapeutic exercises (e.g., strengthening, balance training) and functional exercises (e.g., gait and mobility tasks), we hypothesised that PTs would integrate these types of interventions into their practice. Finally, the study aims to investigate possible correlations between PT' years of experience, encounters with AD patients and the level of care provided based on disease progression, and their theoretical knowledge of AD.

## Material and methods

### *Population*

Participants were recruited voluntarily with experience or current employment as a PT in nursing homes in Belgium. To qualify for the survey, participants had to have previously cared for at least one person with AD. To maximise participation, we disseminated the questionnaire link on social media platforms for a period of 4 months (from December 2022 to April 2023) and by email using a contact list of nursing homes in Belgium. The email was sent to various institutions in January 2023, the reminder sent in April 2023. The responses were kept completely anonymous.

### *KAP questionnaire*

#### *Development of the questionnaire*

The KAP survey is used to assess the educational needs of a specific target group. It measures the population's understanding of a subject and identifies their attitudes and behaviours in relation to it. While these components are distinct, they are interrelated, as behaviours often stem from attitudes, which in turn are shaped by the level of knowledge of the population being surveyed. The KAP survey focuses on problem solving and methods that can facilitate understanding and action to address barriers that prevent the reduction of unfavourable behaviours.[9] In developing the survey, we used the "Handicap International" guidelines for the design and implementation of KAP surveys.[10] At the end, a 28-question survey was designed for PT working in nursing homes or long-term care facilities who have worked with people diagnosed with AD. The survey has been carefully designed, based on the KAP survey model, and has been informed by the scientific literature on AD. It was further refined and validated by experts: Françoise Lekeu, neuropsychologist at the University Hospital of Liège, Catherine Olivier, occupational therapist and physical therapist at the Memory Centre of the University Hospital of Liège, and Maryse Sgarlata, head of a "Cantou" service at the nursing home 'La Kan'. The survey was distributed online via the Sondage Online platform, which facilitated direct responses from PT without the need for physical distribution. Participation in the survey was voluntary and of course anonymous and, consequently, the advice of the ethical committee was not needed for this study.

#### *Content and structure of the questionnaire*

##### *Knowledge*

This section focuses on the knowledge considered essential for the effective management of people with AD in physical therapy. It covers aspects of the disease that directly affect intervention: memory impairment (i.e. types and consequences), loss of language production and comprehension (i.e. timing and consequences), practical impairment (i.e. definition and consequences) and psychomotor disadaptation syndrome (i.e. definition). It consists of 10 multiple-choice questions, some of which allow multiple answers.

##### *Attitude*

This section assesses PT attitudes towards people with AD. It consists of 8 multiple-choice questions with multiple answers. In addition, there are three questions about the support provided to the individual as the disease progresses. For example, questions included how therapists introduce themselves to patients, adapt communication when patients have comprehension difficulties, respond to treatment refusal, or manage hallucinations. These questions aimed to assess therapists' approaches to communication, reassurance, and adaptation of care in daily interactions with people with AD.

##### *Practice*

This section considers an individual at stage 2 of the Clinical Dementia Rating scale with AD.[11] Providing participants with a typical patient profile was considered essential due to the progressive nature of the disease and its impact on physiotherapy intervention. Before answering the practice section, participants were given a brief definition of stage 2 of the Clinical Dementia Rating scale, describing moderate cognitive impairment with some difficulties in daily activities but still retaining basic autonomy. The practice section consists of a single question containing 17 statements describing different treatment modalities described in the literature. Respondents were asked to select one of the following answers: 'never - almost never - sometimes - often - almost always - always'. It is important to note that certain interventions listed, such as massage, aromatherapy, and Snoezelen, may not typically fall within PT scope in all countries. Snoezelen refers to multisensory stimulation rooms providing controlled sensory experiences (light, sound, touch, smell) to promote relaxation and reduce behavioural disturbances. Aromatherapy involves the use of essential oils for olfactory stimulation, relaxation, or calming purposes. While these are not universally used by PTs, in Belgian nursing homes, they may be integrated into therapy sessions to complement physical interventions.

*Statistical analyses*

The 'knowledge' section was coded to create two categories based on the 44 statements: those with <75 % correct responses and those with >75 % correct responses. Attitudes' were categorised into two groups depending on whether the respondent held a particular attitude or not. Practices' were grouped into 6 categories based on respondents' answers (never - almost never - sometimes - often - almost always - always). In order to determine whether there was a relationship between the percentage of correct knowledge responses and the percentage of assistance provided at different stages of the disease, normality was first checked with the Shapiro-Wilk test. Student's *t*-tests or Mann-Whitney tests were then performed, depending on the normal or non-normal distribution of these variables. The same method was applied to the number of years of general physiotherapy experience, nursing home experience and the number of people with AD encountered. A significance level of 0.05 was used for all statistical tests. R Commander software was used to perform various statistical tests.

## Results

*Participants*

The questionnaire was accessed by 183 people, but was completed in full by 133 PT working in nursing homes or long-term care facilities. Of the 133 respondents who completed the survey, 92 were women (69.2 %), 40 were men (30.1 %) and one person chose not to answer (0.8 %). The most common age groups of respondents were 31–35 years (18.8 %) and 26–30 years (18 %). Other age groups were relatively evenly distributed (between 7.5 % and 12 %), with the exception of those aged 60 and over, who represented only 6 % of respondents. In terms of experience as a PT, almost a quarter (24.1 %) said they had 0–5 years of experience, with a progressive decrease thereafter, with the 16–25 years category representing only 6.02 %. None of the respondents were retired. In terms of experience specifically in nursing homes, almost a third (30.08 %) reported 0–5 years and the percentages decreased progressively, almost halving every 10 years. Only 3 % of respondents had worked in a nursing home for >35 years. On average, participants encountered approximately 38.1 % of people with AD in their practice, although there was considerable variation in responses.

*Knowledge, attitudes and practices*

*Knowledge*

Overall, respondents performed well (over 80 % correct responses regarding whether certain disorders were part of AD), except for questions related to the presence of spasticity, apraxia, allodynia, rest tremor and thermoalgesic sensitivity issues (Table 1).

Among respondents, 95.5 % indicated that short-term/working memory is generally more impaired in the early stages of the disease, which is accurate. Half of the respondents (50.4 %) noted procedural memory is also affected in the early stages, whereas it's long-term/episodic memory (7.5 % of respondents) that is affected.

The consequences of this memory loss include difficulties in encoding new information (91.7 % of respondents) and challenges in managing dual-task (73.7 % of respondents). While 55.6 % indicated 'difficulty in performing routine tasks', this is more common in advanced stages of AD rather than in the early stages.

In the area of language, production is typically affected first (18 % of respondents). Understanding is usually affected at a later stage. In terms of language production, people may have difficulty finding words, using appropriate terms or stop speaking (41.4 % of respondents). Regarding language comprehension, depending on the stage of AD, people may have difficulty understanding the meaning of words, humour or the implicit content of conversations (63.2 % of respondents).

**Table 1**
Problems caused by AD as seen by PT ($n$ = 133).

| Items | Right answer ( %) | Do not know ( %) | Correction |
|---|---|---|---|
| Memory disorders | 100 | 0 | True |
| Problems with language production | 94.7 | 1.5 | True |
| Problems understanding language | 91.7 | 3.76 | True |
| Spasticity | 64.7 | 9.77 | False |
| Apraxia | 70.7 | 6.77 | True |
| Allodynia | 45.1 | 35.3 | False |
| Impaired recognition of places and objects | 99.3 | 0.7 | True |
| Impaired recognition of people | 98.5 | 0 | True |
| Rest tremor | 72.2 | 17.3 | False |
| Impaired attention and concentration | 97.0 | 1.5 | True |
| Decreased reaction speed | 84.2 | 4.5 | True |
| Wandering and motor agitation | 88.0 | 5.3 | True |
| Thermal sensitivity disorder | 32.3 | 40.6 | False |

The majority of respondents (87.20 %) provided a correct definition of praxis. Regarding the impairment of praxis, the percentages of correct responses ranged from 72.9 % for ideational praxis to 29.3 % for constructive or constitutive praxis.

*Attitude*

The attitude section assessed general beliefs and approaches towards people with AD, including communication behaviours (e.g., introducing themselves), responses to treatment refusals, and managing behavioural symptoms such as hallucinations or repeated questions. While some items may reflect practical adjustments, they were framed to capture underlying attitudes guiding these actions. For example, when caring for people with AD, most PT introduce themselves (66.9 %) or give their name (52.6 %). Almost 39.09 % do both. If a patient refuses treatment, 88 % try again later and 63.2 % adapt treatment options.

When there are comprehension problems, 91 % simplify explanations and demonstrate gestures. Some 81.2 % reassure patients who have hallucinations. When patients repeat questions, 77.4 % re-explain using simpler language and 63.2 % use gestures to aid understanding.

Respondents use simple language (82.7 %) and speak more slowly (66.2 %) to improve communication. Almost 66.9 % avoid upsetting patients due to emotional difficulties or attention problems.

They consider the risk of falls during exercises (82.7 %) due to caution, gait problems (45.9 %) and the need for safety (51.9 %). As the disease progresses, the percentage of assistance increases from 44.32 % to 80.9 % at the end of life.

*Practices*

In this section, respondents had to choose one response (never, rarely, sometimes, often, almost always, always) for each proposition, based on their practical experience. The percentages of their responses are collated in Table 2. It's important to note that the responses were selected for caring for an AD patient at stage 2 of the Clinical Dementia Rating scale.

*Relationship between knowledge and other parameters*

Overall, no significant relationships were found between PTs' theoretical knowledge about AD and their attitudes, practices, or levels of experience. For example, assistance rates provided at different disease stages did not differ according to knowledge levels, with mean assistance in early-stage AD at 46.9 ± 28.4 % for PTs with <75 % correct knowledge versus 41.6 ± 29.6 % for those with ≥75 % ($p$ = 0.28). Similar non-significant differences were found for intermediate ($p$ = 0.94) and end-stage care ($p$ = 0.15). Knowledge level also did not influence the

**Table 2**
Summary of PT practices in the care of AD patients in nursing homes ($n$ = 133).

| Items | Never | Rarely | Sometimes | Often | Almost always | Always |
|---|---|---|---|---|---|---|
| I go to a quiet place | 0.75 % | 2.26 % | 21.05 % | 34.59 % | 29.32 % | 12.03 % |
| I talk to the patient during the session | 5.26 % | 11.28 % | 31.58 % | 29.32 % | 16.54 % | 6.02 % |
| I show and explain the exercises | 0 % | 0 % | 8.27 % | 15.79 % | 39.85 % | 36.09 % |
| I give the patient simple exercises to do so that he/she doesn't fail | 0.75 % | 1.50 % | 19.55 % | 24.81 % | 30.08 % | 23.31 % |
| I work on lower limb strength | 0.75 % | 3.76 % | 7.52 % | 27.07 % | 29.32 % | 31.58 % |
| I work on balance | 0 % | 0 % | 16.54 % | 24.81 % | 36.09 % | 22.56 % |
| I work on coordination | 0.75 % | 3.76 % | 22.56 % | 30.83 % | 27.07 % | 15.04 % |
| I work on walking | 0 % | 0 % | 4.51 % | 12.03 % | 37.59 % | 45.86 % |
| I give the patient a massage | 9.77 % | 31.58 % | 36.84 % | 18.05 % | 0.75 % | 3.01 % |
| I use the Snoezelen technique | 60.90 % | 12.03 % | 19.55 % | 3.76 % | 2.26 % | 1.50 % |
| I use aromatherapy | 66.92 % | 12.03 % | 12.78 % | 3.76 % | 3.76 % | 0.75 % |
| I leave it up to the patient to choose how to be cared for on the day | 12.78 % | 21.05 % | 42.11 % | 12.78 % | 9.77 % | 1.50 % |
| I adapt my treatment according to the state of disorientation of the patient | 0 % | 0 % | 2.26 % | 17.29 % | 27.07 % | 53.38 % |
| I adapt my communication to the comprehension difficulties | 0 % | 0 % | 2.26 % | 6.77 % | 26.32 % | 64.66 % |
| I carry out tests to assess walking difficulties | 6.77 % | 9.02 % | 36.09 % | 18.80 % | 11.28 % | 18.05 % |
| I carry out tests to assess the risk of falling | 6.77 % | 7.52 % | 35.34 % | 18.80 % | 12.78 % | 18.80 % |
| I usually explain to the rest of the nursing staff how best to interact with people with AD | 9.02 % | 13.53 % | 28.57 % | 26.32 % | 12.78 % | 9.77 % |

proportion of Alzheimer's patients encountered in practice ($37.6 \pm 24.0$ % vs. $38.6 \pm 23.7$ %; $p = 0.84$) nor years of professional experience (general PT experience: $p = 0.60$; nursing home experience: $p = 0.75$). However, two specific attitudes showed significant associations: PTs with higher knowledge were more likely to simplify explanations and demonstrate gestures when patients had comprehension difficulties ($p = 0.019$), and to let patients express themselves when experiencing hallucinations ($p = 0.044$). Regarding practices, PTs with $\geq$75 % knowledge were significantly more likely to demonstrate exercises while explaining them ($p = 0.004$), whereas those with $<$75 % knowledge reported giving massages more frequently ($p = 0.047$). These results suggest that while general associations were limited, certain communication and practical demonstration behaviours were positively influenced by higher theoretical knowledge.

The study also found that the level of assistance (e.g., supervision, physical support) provided to people with AD at different stages of the disease did not differ significantly according to PTs' levels of theoretical knowledge about the disease ($P > 0.05$). In addition, our analysis showed that therapists' level of knowledge or years of experience did not significantly influence the proportion of AD patients they reported seeing in their practice ($p > 0.05$).

Overall, the findings suggest that while certain specific attitudes and practices appear to have some relationship with theoretical knowledge levels, in general the relationship between knowledge of AD and the attitudes, practices and experience of PT working with AD patients appears to be limited or not clearly established.

## Discussion

Contrary to our initial hypothesis, our results showed that PT overall had a good knowledge of AD and its related problems, although some additional complications were related to AD but not directly part of it (such as thermoalgesic sensitivity, allodynia and spasticity). Theoretical knowledge of memory seemed to be better than that of language. This could be explained by the widespread international interpretation of AD as primarily a memory-related disease.[12,13] Our findings contrast somewhat with other works suggesting that in geriatric care structures, caregivers of all categories had misconceptions about the nature and definition of AD.[14] Nevertheless, our results are consistent with a study indicating high dementia knowledge scores among physical therapists, yet most respondents expressed reduced confidence due to insufficient skills in managing associated behavioural or cognitive symptoms.[15]

According to our results, when assessing attitudes to managing behavioural and psychological symptoms of dementia, PTs tend to reassure patients (81.2 %), re-explain using simpler language (77.4 %), defer treatment and try again later (88 %), or offer alternative therapy options (63.2 %). It has been suggested that only behaviour management therapies and caregiver training have sustained efficacy in managing these symptoms.[16] However, the lack of evidence for other types of intervention doesn't necessarily mean they are ineffective. PT generally tend to simplify their grammar and words when speaking to people with AD, in line with the existing literature on communication methods.[17] However, the effectiveness of speaking slowly seems contradictory. Touch is often used in the care of people with dementia, contrary to our initial hypothesis.

In terms of practice, strength, balance and coordination exercises are commonly prescribed, in line with theories that emphasise the importance of these exercises for patient autonomy and quality of life.[18,19] Walking is often included, as slow gait speed has been shown to be associated with an increased risk of falls in AD.[20] There's limited use of aromatherapy and snoezelen, although the literature suggests their potential for relaxation. Although massage techniques are rarely used by PTs, patient touch, meaning physical contact techniques, is commonly employed for facilitation and support. In Belgian nursing homes, massage is sometimes used for relaxation or behavioural management, but this falls outside traditional PT goals focused on musculoskeletal function. That being said, massage may aid in managing behavioural, emotional, and potentially other conditions linked to dementia.[21] We should however acknowledge that while our survey captured the types of interventions used, it did not assess the subtle therapeutic adjustments, such as specific hand placements or facilitation commands, that are integral to effective PT practice.

Statistical tests did not reveal any significant relationships between theoretical knowledge and attitudes/practices, years of experience, number of people with AD encountered, or level of support provided at different stages of the disease. This contradicts our initial hypotheses. The lack of significant associations between theoretical knowledge and care provision doesn't mean that the training is ineffective. It's important to integrate theoretical knowledge with behavioural aspects and ethical considerations. However, in another work, it was shown that among PT, more education related to working with people with dementia was significantly related to positive attitudes.[15]

Some biases have been identified in the way we conducted this study. Firstly, the attrition bias is related to the fact that some people did not complete the questionnaire (183 people started but only 133 finished) because of its length and/or difficulty. Most dropouts occurred in the knowledge section. It's plausible that people with lower levels of knowledge may not have completed the questionnaire

and therefore not be represented in the results of the study. The inclusion of an 'I don't know' option for each question may have reduced the number of drop-outs. Secondly, there may be a social desirability bias, which refers to systematic errors in responses that tend to portray the respondent more favourably in a social context, particularly in the attitudes section. It's possible that some respondents answered these questions thinking about the best attitudes they should have, rather than their actual attitudes. This bias could have embellished the responses in the attitudes section, thus distanced our conclusions from the reality on the ground. Practices are also subject to this bias, but to a lesser extent. One way of reducing this bias would have been to observe a PT treating an AD patient and to complete this section of the questionnaire ourselves. However, organising this with a large number of respondents was a challenge within the scope of this study. Another limitation is that the practice section did not include detailed questions regarding specific therapeutic facilitation strategies, such as the adjustment of verbal and non-verbal cues during balance training. Future studies should incorporate more precise assessments of PT intervention techniques to better inform rehabilitation practice. Also, it's important to note that we used a questionnaire that we developed, as there was no existing questionnaire of this type. Although experts reviewed the survey, involving more practicing PTs in the development process could have ensured greater alignment with physiotherapy terminology and practice realities, and, consequently, it remains an unvalidated initial version. Ongoing modifications and improvements are necessary to minimise various biases. Finally, this survey assessed general practices but did not examine how knowledge translates into specific manual or communication techniques used during PT interventions, which should be addressed in future research.

This study sheds light on the complex landscape of physiotherapy practice for AD in care settings. Going forward, the field could benefit from longitudinal research to track changes in knowledge, attitudes and practices over time, allowing for a more comprehensive understanding of the evolving physiotherapy needs of people with AD. In addition, the integration of qualitative methods, such as interviews or focus groups, could provide nuanced insights into the practical challenges and facilitators that PT face in their day-to-day care. Finally, bridging the gap between research findings and implementation in clinical practice remains critical to promote the translation of evidence-based practices into routine care to improve patient outcomes. It is however important to note that to our knowledge, no studies have compared PT attitudes and practices between Belgium and countries such as the US. However, due to differences in PT education, professional status, insurance systems, legislation, and even the definition of nursing homes, variations in practices and attitudes are to be expected across healthcare contexts.

In conclusion, our study highlights both positive awareness and certain gaps in the knowledge, attitudes, and practices of PT towards AD in residential care. Despite limitations such as incomplete responses and social desirability bias, this research emphasizes the need for validated tools and direct observations to better understand and enhance physiotherapy care for AD patients. Continuous education and refined assessment methods are essential to improve care delivery and address knowledge gaps in the future.

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## Institutional review board statement

Not applicable, as there were no interviews with patients and only an online questionnaire was used with the professionals.

## Informed consent statement

Not applicable

## Data availability

The data presented in this study are available on request from the corresponding author

## Declaration of competing interest

The authors declare no conflicts of interest.

## CRediT authorship contribution statement

**Olivier Bruyère:** Writing – original draft, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Léa Leroy:** Validation, Supervision, Resources, Methodology, Investigation, Formal analysis, Conceptualization. **Catherine Olivier:** Methodology, Formal analysis, Conceptualization. **Céline Demonceau:** Methodology, Formal analysis. **Fanny Buckinx:** Methodology, Conceptualization. **Mathilde Blavier:** Methodology, Formal analysis. **Françoise Lekeu:** Validation, Supervision, Methodology, Investigation, Formal analysis, Conceptualization.

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