Received: 11 November 2020 | Revised: 21 May 2021 | Accepted: 8 June 2021

DOI: 10.1002/hsr2.316

RESEARCH ARTICLE

Health Science Reports Open Access WILEY

Prevalence and persistent use of analgesic drugs in older adults receiving domiciliary care at baseline—A longitudinal study

Kjerstin Tevik[1,2] | Jūratė Šaltytė Benth[3,4,5] | Marte Aarøen[1] | Marie Turmo Lornstad[1] | Sverre Bergh[2,3] | Anne-S. Helvik[1,2]

[1]Department of Public Health and Nursing, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

[2]Norwegian National Advisory Unit on Ageing and Health, Vestfold Hospital Trust, Tønsberg, Norway

[3]Research Centre for Age-related Functional Decline and Disease, Innlandet Hospital Trust, Ottestad, Norway

[4]Institute of Clinical Medicine, Ahus Campus, University of Oslo, Oslo, Norway

[5]Health Services Research Unit, Akershus University Hospital, Lørenskog, Norway

Correspondence
Kjerstin Tevik, Holemslykkjvegen 63, 7224 Melhus, Trøndelag, Norway.
Email: kjtev@online.no

Funding information
Innlandet Hospital Trust; Norwegian Directorate of Health

Abstract

Aims: To describe the prevalence and persistence of analgesic drug use (opioids and antipyretics [ie, paracetamol and acetylsalicylic acid]) in participants (≥70 years) with and without dementia receiving domiciliary care in the eastern part of Norway. In addition, to explore factors associated with persistent drug use and examine whether drug use has changed after admission to a nursing home.

Methods: A longitudinal study with 1001 participants (mean [SD] age 83.4 [5.7] years) receiving domiciliary care. Medical information including analgesic drug use was collected at baseline (A1) between August 2008 and December 2010, follow-up assessments after 18 (A2) and 36 months (A3). Analgesic drugs prescribed for regular use were recorded from the participants' medical records. The participants' cognitive and physical health was evaluated at all assessments. Level of care (domiciliary care or nursing home care) was recorded at A2 and A3. Generalized linear mixed models were used to examine the prevalence and persistence of analgesic drug use.

Results: The prevalence of prescribed use of antipyretics and opioids was 13.6% and 9.2%, respectively. Participants with dementia had more frequent use of antipyretics in all assessments and opioids in the last assessment than participants without dementia. Persistent use of both antipyretics and opioids was high between two consecutive assessments, both for participants with and without dementia. Persistent use of analgesics was associated with poorer physical functioning, but not by level of care. Overall, there was no difference between those admitted to a nursing home and those receiving domiciliary care at follow-up, with respect to change in analgesic drug use over time.

Conclusion: The prevalence and persistent use of analgesics were high in older adults receiving domiciliary care at baseline and especially in participants with dementia. A holistic approach and interdisciplinary collaboration are essential to effectively assess and treat pain in older adults.

KEYWORDS

aged, Alzheimer disease/drug therapy, analgesics/therapeutic use, dementia/drug therapy, nursing homes, pain management

1 | INTRODUCTION

Pain is a common symptom in older adults,[1-3] and the estimated overall prevalence varies between 40% and 72% among older adults in the USA,[4] Europe,[5,6] and Norway.[7] The prevalence of pain in individuals with dementia is estimated to be between 40% and 80%.[8-10] A Swedish study of older adults living at home or in an institution found that 38% of people without dementia and 27% of people with dementia reported pain the last month.[11] Routine screening and careful assessment of pain are essential in older adults.[1] However, older adults frequently underreport pain, and consequently, their pain tends to be undertreated.[12] Assessing the level of pain can be difficult in people with dementia due to memory and communication impairment and neuropsychiatric symptoms, with a risk of unrecognized pain and inadequate pain treatment in this group.[8-10,13-15] Proper pain assessment and treatment in older adults with dementia is essential as pain treatment in this group of patients seems to reduce agitation and aberrant motor behavior.[16]

Analgesics are often prescribed for pain relief in older adults.[12,17-20] For example, studies have found that 50%-70% of community-dwelling older adults (>75 years) used analgesic drugs.[21,22] It has also been shown that community-dwelling older adults with dementia use analgesic drugs more often than those without dementia.[11] However, this finding is not consistent across all studies.[23] The prevalence of prescribed analgesics among nursing home residents with dementia is known to be high (55%-69%).[10,16] Comorbidity, cognitive impairment, polypharmacy, and a higher risk of adverse drug reactions due to age-related changes in pharmacokinetics and pharmacodynamics, make pain treatment with analgesics, especially opioids, more complicated in older adults.[1] The risk of adverse events must be balanced against the need for adequate analgesics.[12]

Paracetamol/acetaminophen is recommended as the first-line therapy for pain in older adults.[1,8,24] Paracetamol seems to be safe to prescribe to older adults.[8,17,25] However, unintentional overdose of paracetamol is an important cause of hepatotoxicity,[17] and no study has examined the safety of long-term use of paracetamol in persons with dementia.[8]

According to Norwegian guidelines, the prescription of opioids in the treatment of chronic non-malignant pain should be restricted because opioids are addictive and have serious side effects.[26] Current UK (United Kingdom)[24] and US[1] guidelines on the management of pain in older adults, recommend that opioids could be used for moderate to severe pain or in older adults with substantial impairment in functioning or quality of life when other treatments have not been successful.[1,17,24] However, the evidence for the management of pain in older adults with opioids is low and side effects such as constipation, sedation, and nausea limit the use.[17] Safe use of opioids should especially be considered in persons with dementia.[8,27] Evidence-based guidelines for treating pain in people with dementia do not exist and need to be established.[8]

The prevalence of analgesic drug use is expected to be equally high in older adults receiving domiciliary care in Norway for both those with and without dementia, but as far as we know this has not been studied. Domiciliary care in Norway is range of services provided by health personnel and/or domestic help to support individuals living in their own homes. The jurisdiction to provide for domiciliary care lies within the local municipalities.[28] These services delivered by the municipalities could typically include "meals on wheels," safety alarm, practical aid, daycare center, mental health care, or in-home nursing.

Moreover, there have been no studies of whether the prevalence and persistent use of analgesic drugs are associated with dementia, neuropsychiatric symptoms, and/or physical health in residents receiving domiciliary care. Nor is it known whether there are changes in the use of analgesic drugs after admission to a nursing home. A study focusing on these gaps could contribute significantly to the knowledge base in this field.

In this study, the first aim was to assess the prevalence of analgesic drug use in individuals ≥70 years of age at baseline, after 18 months, and after 36 months, as well as persistent analgesic drug use from baseline to 18 months and from 18 to 36 months in total. In addition to stratifying by dementia status and by living at home or admitted to a nursing home during follow-up. The second aim was to assess the use of analgesic drugs as adjusted for use one or two time points earlier (persistent use), and to explore the factors associated with persistent analgesic drug use. The third and last aim was to explore whether there were any changes in the use of these drugs following admission to a nursing home.

2 | METHODS

2.1 | Study design

This study had a longitudinal design with a 36-month period of follow-up of older adults receiving domiciliary care in Norway. Baseline data collection (A1) was performed between August 2008 and December 2010 while follow-up assessments were performed 18 months (A2) and 36 months (A3) after the baseline data collection period. Participants who were admitted to a nursing home during follow-up were assessed at the nursing home.

2.2 | Participants

A total of 1796 individuals (age ≥ 70 years) from 19 rural and urban municipalities of various sizes in the eastern part of Norway were invited to participate. An inclusion criterion was that the participants received domiciliary care (of differing amounts and types) from the municipality. We included both established recipients and new recipients of domiciliary care and recruited new recipients successively. The participants needed to have a next of kin/caregiver who met them at least once every week due to simultaneous data collection from both resident and caregiver. To be able to give correct information about the participant, the next of kin must know the participant well.[15]

2.3 | Measures

2.3.1 | Analgesic drugs

Drugs prescribed for regular use (not including drugs prescribed for use as needed) were recorded from the participants' medical records. The drugs were coded according to the World Health Organization's anatomical therapeutic chemical (ATC) classification system.[29] Analgesic drugs were divided into opioids (N02A), other analgesics, and antipyretics (ie, paracetamol, acetylsalicylic acid) (N02B) and antimigraine medication (N02C) (ie, sumatriptan and zolmitriptan). Drug prescription was categorized into yes or no. Medication dosages were not available for the analysis.

2.3.2 | Physical and cognitive health

A detailed description of the screening tools used to assess physical health, activities of daily living, cognitive function, and neuropsychiatric symptoms are found in Lornstad et al.[30] The participants' cognitive and physical health was evaluated at all assessments. Physical health was assessed by the General Medical Health Rating Scale (GMHR),[31] while Personal activities of daily living (P-ADL) were evaluated using the Physical Self-Maintenance Scale (PSMS)[32] based on information from caregiver. Cognitive function and severity of dementia were assessed with four screening tools: Mini-Mental State Examination (MMSE),[33] Clock Drawing Test (CDT),[34] the Informant Questionnaire on Cognitive Decline in Elderly (IQ-CODE),[35] and Clinical Dementia Rating scale (CDR).[36,37] Neuropsychiatric symptoms were assessed using the Neuropsychiatric Inventory (NPI)[38] based on information from caregiver. All assessments used to evaluate cognitive function, dementia severity, and neuropsychiatric symptoms have been translated and adapted for use in Norway.[39-42]

Dementia diagnosis was set based on all collected data from the participants and according to the International Statistical Classification of Diseases criteria, version 10 (ICD-10) by two experienced physicians in geriatric psychiatry.[43] A third physician in geriatric psychiatry was consulted in cases of disagreement.

The formal level of care was recorded as either receiving domiciliary care or nursing home care at the follow-up assessments. The type of domiciliary care was recorded as home nursing, domestic help or support including food delivery, safety alarm, and day care center. We recorded demographic data: that is, age, gender, and the person's municipality of residence and marital status.

2.4 | Procedure

A research nurse led the data collection process and collaborated with the assessors (nurses, occupational therapists, and social educators) in the 19 municipalities. More details of the procedure are described by Lornstad et al.[30] Written informed consent was collected from both the participant and their next of kin prior to the baseline interview. For those participants not capable of giving informed consent, their next of kin gave consent on their behalf. The project was approved by the Regional Committee for Medical and Health Research Ethics for Eastern Norway (REC 2010/119 & 601), the Norwegian Social Science Data Services, and the Directorate for Health and Social Affairs.

2.5 | Data analysis

Patient characteristics at baseline are presented as means and SD or as frequencies and percentages, as appropriate. Data were likely to exhibit a hierarchical structure, as the participants belonged to different municipalities. To adjust for possible cluster effect within the municipality, participants with and without dementia were compared using a linear mixed model for continuous data or a generalized linear mixed model for categorical data. The models contained fixed effects for dementia status and random intercepts for municipality when necessary. Prevalence and persistent use (drug use at two consecutive time points) of analgesic drugs in total, stratified by dementia/no dementia, and by admission to nursing home/living at home were presented as percentages. Groups were compared using a generalized linear mixed model adjusting for cluster effects at the municipality level, if present.

For each defined category, the odds for analgesic drug use at one time point adjusted for use at one or two time points earlier (Lag 1 and Lag 2, respectively) were analyzed by a generalized linear mixed model with random intercepts for municipality. In this model, the dependent variable was use of the given category of analgesic drug at A2 or A3, whereas the independent variable was use of the same analgesic drug at baseline. The model was adjusted for age, gender, marital status, and health measures assessed at baseline, and reduced by Akaike's Information Criteria (AIC). A lower value of AIC indicates a better model.

A generalized linear mixed model with random effects for patients nested within municipality was used to assess factors associated with the persistent use of each category of analgesic drugs. In this model, the outcome was persistent use vs non-persistent use at two consecutive time points, that is, a longitudinal variable. The model was adjusted for covariates measured at baseline (age, gender, and marital status) and at a previous time point (health measures). Lastly, the effect of level of care (nursing home care vs domiciliary care) on analgesic drug use assessed simultaneously was estimated by the model with random effects for patients nested within municipality and fixed effects for level of care and interaction between the time and level of care. The model included covariates measured at baseline (age and gender) or at the same time point (marital status and health measures). The results were presented as odds ratios (OR) and 95% confidence intervals (CI). Interactions were illustrated graphically to allow for easier interpretation.

Only cases with no missing values on covariates were included in the regression models. The analyses were performed with SPSS version 26[44] and SAS version 9.4.[45] All tests were two-sided, and probability values below 0.05 were considered statistically significant.

3 | RESULTS

3.1 | Sample characteristics

Of the 1796 individuals invited, 795 declined to participate, thus 1001 were potential participants. Compared to the participants, non-participants were older and more often women. In the total sample of 1001 participants, the mean (SD) age was 83.4 (5.7) years, 683 (68.2%) were female and 703 (70.2%) were single or a widow/widower (see table 1 in Reference 30). At baseline, 415 (41.5%) of participants were diagnosed with dementia. Participants with dementia were older (84.5 vs 82.6 years), had poorer physical health, lower P-ADL-function, and had more neuropsychiatric symptoms compared to participants without dementia. In addition, those with dementia had a greater need for home nursing (85% vs 55.6%) and other types of support in their homes (66.5% vs 55.8%) than those without dementia.[30]

Of the 1001 participants, 599 (59.8%) and 456 (45.5%) were available for the second (A2), and the third assessment (A3), respectively. Three persons lacked essential information and were omitted from further analyses (see fig. 1 in Reference 30). Mean follow-up time between A1 and A2, and A2 and A3, was 598.5 days (SD 67.8) and 517.5 days (SD 81.5), respectively. In total, 629 participants were lost during follow-up (324 deaths, 263 lost to follow-up, and 42 participants not evaluated).[30] At A2 and A3, 89 of 599 (14.9%) and 114 of 456 (25.2%) assessed participants, had been admitted to a nursing home.

3.2 | Prevalence of analgesic drug use by dementia and by level of care

The prevalence of analgesic drug use (opioids and antipyretics) is presented in Table 1. We found no use of antimigraine medication in our study sample. Antipyretics were the most frequently used analgesics with a prevalence of 13.6% at A1 and 29.6% at A3. The prevalence of opioid use was 9.2% at A1 and 12.8% at A3. Those with dementia more often used antipyretics at all three time points than those without dementia, while those with dementia used more opioids than those without dementia only at A3. Furthermore, the prevalence of analgesic drug use was higher in those admitted to a nursing home than in those receiving domiciliary care at A2 and A3, except for the prevalence of opioid use at A2 (Table 2).

3.3 | Persistent use of analgesic drugs by dementia

The persistent use of any analgesic drug was high, 64.7% from A1 to A2 and 77.6% from A2 to A3 (Table 1). The persistent use in analgesic drug from A1 to A2 was higher in those with dementia than in those without dementia, with no differences found from A2 to A3. The odds for analgesic drug use at A2 and A3, adjusted for use of the same type

TABLE 1 Prevalence and persistent use of analgesic drugs

	Prevalence (%)							Persistent use (%)			
	A1		A2		A3			A1-A2		A2-A3	
	All (N = 1001)	D/nD (N = 415/586)	All (N = 599)	D/nD (N = 241/358)	All (N = 453)	D/nD (N = 158/295)		All (N = 599)	D/nD N = 241/358	All (N = 453)	D/nD (N = 158/295)
Analgesic drug use											
Opioids	9.2	8.7/9.6	12.2	13.2/11.2	12.8	16.7/8.8*		53.8	52.9/54.3	60.9	66.7/56.0
Antipyretics	13.6	16.9/11.3*	21.4	32.2/10.2***	29.6	41.0/18.1***		63.4	70.0/54.8	75.9	73.2/82.6
Any analgesic drugs	18.4	21.4/16.2*	27.0	37.5/16.3***	34.2	46.3/22.1***		64.7	74.5/54.9*	77.6	77.8/77.1

Note: A1-A3: Assessment 1 = baseline; Assessment 2 = 18 months; Assessment 3 = 36 months; Any analgesic drugs: use of antipyretics and/or opioids.
Abbreviations: D, dementia; nD, no dementia.
*$P < .05$; ***$P < .001$; *P*-values were calculated by generalized linear mixed model adjusting for municipality level if present.

of analgesic drug at A1 (Lag 1 and Lag 2, respectively) are presented in Table 3. The odds for use were highest if the drug was also used at the nearest time point (Lag 1), and lower if the drug was used two time points earlier (Lag 2).

3.4 | Factors associated with persistent use of analgesic drugs at two consecutive time points

In the adjusted analysis of persistent use of analgesic drugs (Table 4), lower P-ADL function (higher PSMS) was the only covariate associated with persistent use of antipyretics.

TABLE 2 Prevalence of analgesic drug use according to nursing home admission

	A2 NHA/no NHA (N = 89/510)	A3 NHA/no NHA (N = 114/339)
Analgesic drug use		
Opioids	15.7/11.6	21.1/10.0**
Antipyretics	38.2/18.4***	49.1/23.0***
Any analgesic drugs	46.1/23.7***	56.1/26.8***

Note: A2-A3: Assessment 2 = 18 months; Assessment 3 = 36 months.
Any analgesic drugs: use of antipyretics and/or opioids.
Abbreviations: NHA, admitted to a nursing home/receiving nursing home care; no NHA, receiving domiciliary care.
**P < .01; ***P < .001; P-values were calculated by generalized linear mixed model adjusting for municipality level if present.

3.5 | Effect of level of care on use of analgesic drugs assessed simultaneously

With respect to change in analgesic drug use from A1 to A2 and A3, we found no overall differences between those admitted to a nursing home and those receiving domiciliary care at follow-up (non-significant interactions in the models in Table 5). Opioid use was stable in time in both groups in unadjusted (Figure 1) and adjusted models (Table 5). There was, however, a significant increase in odds for antipyretic use over time among those receiving domiciliary care, but not among participants admitted to a nursing home in both unadjusted (Figure 1B) and adjusted models.

In the adjusted models, lower P-ADL function (higher PSMS score) was associated with increased odds for the use of antipyretics, while good/fairly good physical health as compared to poor/very poor (GMHR) health was associated with decreased odds for the use of both antipyretics and opioids (Table 5).

4 | DISCUSSION

The prevalence of antipyretic use was higher at all assessments in participants with dementia than without. The prevalence of opioid use was higher in participants with dementia than without only at the last assessment. Persistent use of opioids and antipyretics was high, both for participants with and without dementia. Persistent use of any analgesics (opioids and/or antipyretics) was higher for participants with dementia than without between A1 and A2. The odds for use of analgesics were lower if analgesics were used two time points earlier,

TABLE 3 Analgesic drug use at one time adjusted for use one or two time points earlier

	Unadjusted		Adjusted[a]	
Variable	**OR (95% CI)**	***P*-value[b]**	**OR (95% CI)**	***P*-value[b]**
Lag 1 (N = 565[c])				
Opioids[d]	13.2 (6.6; 26.2)	**<.001**	13.6 (7.0; 26.2)	**<.001**
Antipyretics[e]	9.7 (5.5; 17.0)	**<.001**	9.2 (5.2; 16.3)	**<.001**
Lag 2 (N = 432[c])				
Opioids[f]	6.2 (2.7; 14.4)	**<.001**	6.0 (2.5; 14.2)	**<.001[g]**
Antipyretics[h]	4.5 (2.4; 8.3)	**<.001**	3.9 (2.1; 7.3)	**<.001**

Note: Lag 1: One time point earlier (use at A2 adjusted for use at baseline). *Lag 2*: Two time points apart (use at A3 adjusted for use at baseline).
Abbreviations: CI, confidence interval; OR, odds ratio.
[a]The following adjustment variables were considered: Age, gender, marital status, Clinical Dementia Rate – Sum of Boxes (CDR-SoB), General Medical Health Rating (GMHR), Physical Self-Maintenance Scale (PSMS), Neuropsychiatric Inventory (NPI) Affective, NPI Psychosis and NPI Agitation, all measured at A1 (baseline). Nursing home admission was not included as adjustment variable (no baseline values available). Both models reduced by Akaike's Information Criteria (AIC).
[b]*P*-values were calculated using a generalized linear mixed model adjusting for municipality level if present.
[c]Cases with at least one missing value for covariates were excluded.
[d]Adjusted for PSMS.
[e]Adjusted for CDR SoB and NPI Psychosis.
[f]Adjusted for marital status and CDR SoB.
[g]No cluster effect at municipality level present.
[h]Adjusted for gender, age, marital status and CDR SoB.

TABLE 4 Factors associated with persistent use of analgesic drugs at two consecutive time points

	Opioids (N = 954[a])				Antipyretics (N = 954[a])			
	Unadjusted		Adjusted		Unadjusted		Adjusted	
Variable	OR (95% CI)	*P*-value[b]	OR (95% CI)	*P*-value[b]	OR (95% CI)	*P*-value[b]	OR (95% CI)	*P*-value[b]
Assessed at first of the two consecutive time points								
CDR sum of boxes	1.04 (0.97; 1.12)	.240	0.99 (0.89; 1.10)	.798	1.14 (1.08; 1.20)	**<.001**	1.06 (0.98; 1.15)	.151
GMHR (good/fairly good)	0.61 (0.33; 1.12)	.108	0.78 (0.40; 1.50)	.454	0.56 (0.35; 0.89)	**.014**	0.76 (0.46; 1.26)	.286
PSMS	1.10 (1.02; 1.18)	**.015**	1.11 (0.99; 1.23)	.054	1.17 (1.10; 1.24)	**<.001**	1.09 (1.00; 1.18)	**.044**
NPI agitation sub-syndrome	1.01 (0.94; 1.07)	.878	% 0.99 (0.91; 1.08)	.795	1.03 (0.98; 1.08)	.221	0.98 (0.92; 1.04)	.497
NPI psychosis sub-syndrome	1.01 (0.86; 1.18)	.952	1.00 (0.83; 1.21)	.997	1.05 (0.95; 1.17)	.305	0.99 (0.87; 1.11)	.807
NPI affective sub-syndrome	0.99 (0.94; 1.06)	.888	0.99 (0.92; 1.07)	.746	1.04 (0.99; 1.08)	.060	1.02 (0.97; 1.07)	.375
Married	1.68 (0.88; 3.20)	.119	1.67 (0.82; 3.42)	.160	0.96 (0.56; 1.66)	.881	0.99 (0.53; 1.87)	.983
Entry to NH	1.64 (0.52; 5.16)	.398	1.05 (0.28; 3.87)	.948	4.68 (2.21; 9.90)	**.001**	2.02 (0.84; 4.83)	.116
Assessed at baseline								
Age	0.98 (0.92; 1.03)	.381	0.97 (0.92; 1.03)	.346	1.06 (1.01; 1.11)	**.014**	1.05 (0.99; 1.10)	.063
Males	1.02 (0.52; 2.02)	.957	0.76 (0.36; 1.60)	.469	0.95 (0.56; 1.62)	.847	0.98 (0.53; 1.81)	.945

Note: Bold values shown statistically significant result with a p-value less than 0.05.

Abbreviations: CI, confidence interval; CDR, Clinical Dementia Rating; GMHR, general medical health rating; NH, nursing home; NPI, Neuropsychiatric Inventory; OR, odds ratio; PSMS, Physical Self-Maintenance Scale.

[a]In these analyses the outcome is a longitudinal variable defining persistent vs non-persistent use at A1 to A2 and A2 to A3. Due to missing values on covariates the number does not add to 1055 (599 at A2 + 456 at A3) as some of cases were excluded due to missing values on covariates.

[b]*P*-values were calculated using a generalized linear mixed model adjusting for intra-patient and intra-municipality correlations, with patients nested within municipality, if present.

TABLE 5 Effect of level of care (nursing home care vs domiciliary care) on analgesic drug use

	Opioids (N = 1942)				Antipyretics (N = 1942)			
	Unadjusted		Adjusted		Unadjusted		Adjusted	
Variable	OR (95% CI)/ coefficient (SE)	*P*-value[a]	OR (95% CI)/ coefficient (SE)	*P*-value[a]	OR (95% CI)/ coefficient (SE)	*P*-value[a]	OR (95% CI)/ coefficient (SE)	*P*-value[a]
Effect of main variables								
Time	0.006 (0.006)	.307	0.004 (0.006)	.512	0.02 (0.005)	**<.001**	0.02 (0.005)	**<.001**
Level of care	0.25 (0.70)	.715	−0.05 (0.72)	.950	1.06 (0.55)	.053	0.46 (0.57)	.417
Time*level of care	0.01 (0.02)	.524	0.02 (0.02)	.502	0.0003 (0.02)	.986	−0.005 (0.02)	.791
Assessed at the same time point								
CDR sum of boxes	1.03 (0.99; 1.07)	.141	0.99 (0.94; 1.04)	.684	1.10 (1.06; 1.14)	**<.001**	1.03 (0.98; 1.07)	.256
GMHR (good/fairly good)	0.40 (0.29; 0.57)	**<.001**	0.43 (0.30; 0.62)	**<.001**	0.52 (0.40; 0.69)	**<.001**	0.65 (0.49; 0.86)	**.003**
PSMS	1.06 (1.02; 1.10)	**.006**	1.04 (0.98; 1.09)	.200	1.13 (1.09; 1.17)	**<.001**	1.09 (1.05; 1.14)	**<.001**
NPI agitation sub-syndrome	1.01 (0.98; 1.04)	.510	0.99; 0.96; 1.04	.911	1.02 (0.99; 1.05)	.140	0.98 (0.85; 1.01)	.261
NPI psychosis sub-syndrome	1.03 (0.97; 1.09)	.364	1.01 (0.95; 1.09)	.686	1.10 (1.04; 1.15)	**.001**	1.06 (0.99; 1.12)	.063
NPI affective sub-syndrome	1.02 (0.99; 1.05)	.286	1.01 (0.97; 1.04)	.753	1.04 (1.01; 1.06)	**.002**	1.01 (0.99; 1.04)	.389
Married	1.40 (0.97; 2.04)	.076	1.48 (0.98; 2.23)	.063	1.06 (0.76; 1.47)	.730	1.12 (0.78; 1.61)	.544
Assessed at baseline								
Age	1.00 (0.97; 1.04)	.798	1.01 (0.97; 1.04)	.699	1.03 (0.99; 1.05)	.058	1.01 (0.99; 1.04)	.337
Males	0.90 (0.61; 1.32)	.580	0.74 (0.49; 1.13)	.163	0.85 (0.62; 1.18)	.330	0.72 (0.51; 1.03)	.075

Note: Bold values shown statistically significant result with a p-value less than 0.05.

Abbreviations: CI, confidence interval; CDR, Clinical Dementia Rating; GMHR, General Medical Health Rating; NPI, neuropsychiatric inventory; OR, odds ratio; PSMS, Physical Self-Maintenance Scale.

[a]*P*-values were calculated using a generalized linear mixed model adjusting for intra-patient and intra-municipality correlations, with patients nested within municipality, if present.

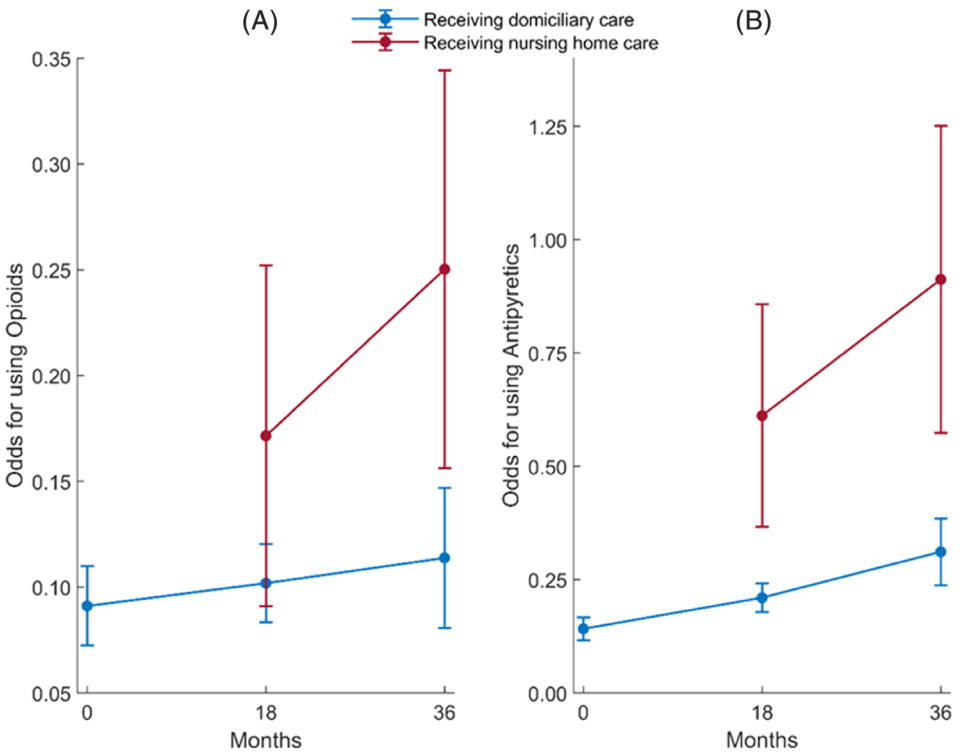

FIGURE 1 (A, B). Interpretation of the interaction term in the model for analgesic drug use in Table 5

compared to if analgesics were used only one time point earlier. Persistent use of analgesics was associated with poorer P-ADL, but not with level of care. Even though no overall difference in change in analgesic drug use was found between those receiving domiciliary care and those admitted to a nursing home during follow-up, the odds for the use of antipyretics increased among those receiving domiciliary care, but not in nursing home residents.

4.1 | Use of analgesic drugs

Proper pain management in older adults is important.[46] We found that the prevalence of use of any analgesic drug at baseline was 18.4%, and 34.2% at A3. Comparable Finnish studies have shown a prevalence of analgesic drug use of 50%-70% in community-dwelling older adults.[21,22] Some of this discrepancy may be explained by the fact that the Finnish studies included Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), which was one of the most prevalent pain medications in their study samples. They also included over-the-counter (OTC) analgesic drugs that are available in both Finland and Norway. As NSAIDs and OTCs are not included in our study, a direct comparison is not possible. On the other side, individuals who declined to participate in our study were older and more often women than those who participated. Thus, the prevalence of analgesic drug use may be underestimated, as prescriptions increase with higher age[18,20,22,47,48] and older women use more analgesic drugs than older men.[48,49]

We found the prevalence of any analgesic drug use at baseline to be higher in participants with dementia than in participants without dementia. This finding is pleasing given previous concerns that pain is under-treated in this patient population.[8-10] Our result is in line with a previous study with a cross-sectional design of community-dwelling older adults in Sweden.[11] This study found that individuals living at home with dementia more often used both opioids and antipyretics (ie, acetaminophen) than those living at home without dementia.[11] However, in our study, the use of opioids did not differ significantly between those with and without dementia receiving domiciliary care. The difference between the two studies may be explained by sample characteristics, in that the residents receiving domiciliary care in our study were older and could have had poorer physical health and a higher level of pain, regardless of dementia status, than the Swedish sample. A study of the oldest adults in Sweden and Finland (≥85 years), including both community-dwelling residents and nursing home residents (16%) found that antipyretics, but not opioids, were more frequently used by individuals with dementia than those without dementia.[50]

In our study, the prevalence of prescribed use of opioids was about 9% at baseline and 13% at the last assessment, and participants with dementia used more opioids than those without dementia at the last assessment. Even though opioids are an effective analgesic, use of opioids in older adults might increase the risk of drug interactions and serious adverse events due to age related changes in pharmacokinetics and pharmacodynamics, comorbidities, and polypharmacy.[17] Other studies conducted among older adults in primary care[51] and among patients with dementia in nursing homes[27] have shown that opioid treatments often were discontinued due to poorly tolerated side effects. Given the adverse events associated with opioid use in older adults, the potential negative effects of opioids must be weighed against the consequences of untreated or partially untreated pain.[17] Moreover, long-term use, that is, daily use over a period of 2-4 week, may result in tolerance and physical dependence. Thus, treatment with opioids in older adults should be considered

discontinued when doable.[12,26,52,53] The STOPP/START criteria (Screening Tool of Older Person's Prescriptions/Screening Tool to Alert doctor to Right Treatment) could be used to support physicians in appropriate prescribing and describing of analgesics in older adults.[54,55] Furthermore, collaboration with nurses and other health personnel could contribute to optimal pain assessment and treatment for older adults receiving home care.

Contrary to most studies of analgesic drug use in older community-living individuals, we explored their persistent use, and found that persistent use of analgesics was generally high both for opioids and antipyretics for people with and without dementia. In adjusted analysis, lower P-ADL functioning (higher PSMS score) was the only independent variable associated with higher odds for the persistent use of antipyretics. This finding could be expected, as the study did not include a pain assessment tool, and P-ADL functioning may partly serve as a proxy for pain. The odds for persistent use compared with use two points earlier were quite high for both opioids and antipyretics. This may be because pain can be quite prevalent,[1-3] and long lasting in older adults receiving care. In addition, the high persistent use of analgesics could be a result of high awareness of pain and a wish for pain treatment of older adults with health problems, independent of whether they are admitted to a nursing home or not. However, the high prevalence of persistent use in our sample may not indicate high quality of pain treatment in older adults with and without dementia. Unfortunately, we did not have information about pain level neither at baseline nor during follow-up, thus, we could not evaluate whether the treatment with analgesics had been successful or whether the treatment was indicated by pain.[8]

Furthermore, we found that the prevalence of any analgesic drug use was higher in participants who had been admitted to a nursing home than in those receiving domiciliary care. However, we did not find an overall difference in change in odds for use of analgesic drugs between those admitted to a nursing home and those receiving domiciliary care. This finding is reassuring, as it indicates that there is no difference in change of pain treatment over time because of level of care. Level of care was of interest since those receiving domiciliary care have their medical follow-up by their general practitioners, while nursing home residents have regular medical follow-up visits at the nursing home, which over time could contribute to differences in changed use of analgesics. However, we found a significant increase in odds for the use of antipyretics over time among those receiving domiciliary care, but not among participants admitted to a nursing home. This finding was somewhat unexpected, as the assumption in Norway is that individuals in nursing homes are frailer than community-dwelling older adults and receive regular medical follow-ups. Thus, we could expect that participants admitted to a nursing home would increase their analgesic drug use over time. However, the relatively limited number of participants admitted to a nursing home during follow-up restricted our statistical power somewhat and may partly explain this result. The odds for receiving pain treatment at one assessment was, as expected, associated with the participants' physical health and physical functioning at the same assessment, independent of level of care.

4.2 | Strengths and limitations

Our study has several strengths. This was a longitudinal study with a large sample size, the data collectors took part in an educational program, and the study used internationally accepted measures.

The study has some limitations of importance. Firstly, participants were not randomly invited from the entire country of Norway. Thus, the sample may not be representative for older adults receiving domiciliary care in Norway. Even so, participants came from municipalities with both urban and rural areas covering a large part of the country. Secondly, a great number of individuals invited to participate at baseline declined participation. Those who refused may have been a selected group, reducing the representativeness of the study population. Moreover, some of the participants at baseline were already regular recipients of domiciliary care from the municipality. It would have been a strength if everyone was recruited when they were first enrolled in domiciliary care services. Finally, a rather high dropout rate might have introduced some degree of bias, and the results should therefore be interpreted with this in mind. Thus, generalizations about the study results should be made with caution.

Thirdly, we had information about the participants' analgesic drug use, but not about doses, length of use, and discontinuation between assessments. We do not have information about indication of analgesic drug use or whether the participants received the optimal analgesic treatment with the correct dose.[8] The drugs may have been prescribed some time ago before our baseline assessment and not reviewed to see if they should be continued. Participants not using analgesic drugs at A1, A2, and/or A3, may have been prescribed these drugs between the assessment intervals. This information was not available in this study and may limit the validity of the results.

Another limitation is that OTC medication was not included in our study, as we only recorded medication prescribed by the general practitioner. The prevalence of medication use may therefore be higher than we found. Another related issue is that we did not include NSAIDs in the present study. The prevalence of analgesic drug use would most likely be higher if these drugs had been included.

Lastly, we did not assess the pain level of the participants. Furthermore, we did not have information about common pain-related conditions, such as cancer, musculoskeletal conditions (arthritis and osteoporosis) and fractures,[1,9,11,17] or side effects of the drug use, here under also constipation and use of laxative.[55] A holistic approach in the pain management in older adults may include non-pharmacological treatment.[8] However, this was not the focus in our study, and consequently we did not have information about these treatment opportunities.

In any subsequent study of prevalence and persistent analgesic drug use among older adults receiving domiciliary care, a tool to assess pain in residents with and without dementia should be included.[56,57] Pain assessment and treatment of older people with and without dementia remains an important topic of study, due to the high clinical significance and the lack of comparable studies with methodical strengths in the field.

4.3 | Clinical implications

A holistic approach and interdisciplinary collaboration (ie, nurses, physicians, pharmacists, and psychologist) are essential to effectively assess and treat pain in older adults.[8] Regular assessment of pain with a valid and reliable screening tool is a prerequisite for optimal pain treatment in older adults.[8,56,57] In our study, the prevalence of persistent analgesic drug use was generally high for both opioids and antipyretics among older adults with and without dementia. It is essential that health personnel in domiciliary care and nursing homes evaluate long-term use of analgesics and regularly monitor effect and potential side effects in older adults.[8]

5 | CONCLUSION

The prevalence and persistent use of analgesics was high in older adults receiving domiciliary care at baseline and especially in participants with dementia. A holistic approach and interdisciplinary collaboration are essential to effectively assess and treat pain in older adults. Appropriateness of prescribing and describing of analgesics is important.

ACKNOWLEDGMENTS

We wish to acknowledge the valuable personal health information contributed by the participating individuals, and the medical staff who performed the data collection. The Research Centre collected data for Age-related Functional Decline and Disease, Sykehuset Innlandet HF, Norway.

CONFLICT OF INTEREST

The authors have reported no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conceptualization: Sverre Bergh and Anne-Sofie Helvik

Formal Analysis: Jūratė Šaltytė Benth, Marte Aarøen, and Marie Turmo Lornstad

Methodology: Kjerstin Tevik, Sverre Bergh, and Anne-Sofie Helvik

Supervision: Anne-Sofie Helvik

Writing – Original Draft Preparation: Kjerstin Tevik, Jūratė Šaltytė Benth, Marte Aarøen, Marie Turmo Lornstad, Sverre Bergh, and Anne-Sofie Helvik

Writing – Review & Editing: Kjerstin Tevik, Jūratė Šaltytė Benth, Marte Aarøen, Marie Turmo Lornstad, Sverre Bergh, and Anne-Sofie Helvik

Data integrity: Jūratė Šaltytė Benth

Jūratė Šaltytė Benth had full access to all of the data in this study and takes responsibility for the integrity of the data and the accuracy of the data analyses.

All authors have read and approved the final version of the manuscript.

TRANSPARENCY STATEMENT

The corresponding author (KT) affirms that this manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned have been explained.

FUNDING INFORMATION

Data collection was financed by the Norwegian Directorate of Health and Innlandet Hospital Trust.

DATA AVAILABILITY STATEMENT

The data belong to the Center for old age psychiatry research, Innlandet Hospital trust, and will not be shared due to The Regional Committee for Medical and Health Research Ethics and Norwegian regulations.

ORCID

Kjerstin Tevik https://orcid.org/0000-0002-9810-8276

Anne-S. Helvik https://orcid.org/0000-0002-2632-0913

REFERENCES

1. Pharmacological management of persistent pain in older persons. *J Am Geriatr Soc*. 2009;57(8):1331-1346.
2. Blyth FM, March LM, Brnabic AJ, Jorm LR, Williamson M, Cousins MJ. Chronic pain in Australia: a prevalence study. *Pain*. 2001;89(2–3):127-134.
3. Halla-aho SM, Tilvis RS, Strandberg TE, Pitkala KH. Musculoskeletal pain and its treatment among older home-dwelling people: ten-year changes in two Finnish birth cohorts. *Arch Gerontol Geriatr*. 2013;56(1):285-289.
4. Patel KV, Guralnik JM, Dansie EJ, Turk DC. Prevalence and impact of pain among older adults in the United States: findings from the 2011 National Health and aging trends study. *Pain*. 2013;154(12):2649-2657.
5. Jakobsson U, Klevsgard R, Westergren A, Hallberg IR. Old people in pain: a comparative study. *J Pain Symptom Manage*. 2003;26(1):625-636.
6. Thomas E, Peat G, Harris L, Wilkie R, Croft PR. The prevalence of pain and pain interference in a general population of older adults: cross-sectional findings from the north Staffordshire osteoarthritis project (NorStOP). *Pain*. 2004;110(1–2):361-368.
7. Landmark T, Romundstad P, Borchgrevink PC, Kaasa S, Dale O. Associations between recreational exercise and chronic pain in the general population: evidence from the HUNT 3 study. *Pain*. 2011;152(10):2241-2247.
8. Achterberg W, Lautenbacher S, Husebo B, Erdal A, Herr K. Pain in dementia. *Pain Rep*. 2020;5(1):e803.
9. Corbett A, Husebo BS, Achterberg WP, Aarsland D, Erdal A, Flo E. The importance of pain management in older people with dementia. *Br Med Bull*. 2014;111(1):139-148.
10. Griffioen C, Husebo BS, Flo E, Caljouw MAA, Achterberg WP. Opioid prescription use in nursing home residents with advanced dementia. *Pain Med*. 2019;20(1):50-57.
11. Haasum Y, Fastbom J, Fratiglioni L, Kareholt I, Johnell K. Pain treatment in elderly persons with and without dementia: a population-based study of institutionalized and home-dwelling elderly. *Drugs Aging*. 2011;28(4):283-293.
12. Pergolizzi J, Boger RH, Budd K, et al. Opioids and the management of chronic severe pain in the elderly: consensus statement of an international expert panel with focus on the six clinically most often used World Health Organization step III opioids (buprenorphine, fentanyl, hydromorphone, methadone, morphine, oxycodone). *Pain Pract*. 2008;8(4):287-313.
13. Horgas AL, Tsai PF. Analgesic drug prescription and use in cognitively impaired nursing home residents. *Nurs Res*. 1998;47(4):235-242.

14. Nygaard HA, Jarland M. Are nursing home patients with dementia diagnosis at increased risk for inadequate pain treatment? *Int J Geriatr Psychiatry*. 2005;20(8):730-737.
15. Wergeland JN, Selbaek G, Hogset LD, Soderhamn U, Kirkevold O. Dementia, neuropsychiatric symptoms, and the use of psychotropic drugs among older people who receive domiciliary care: a cross-sectional study. *Int Psychogeriatr*. 2014;26(3):383-391.
16. Habiger TF, Flo E, Achterberg WP, Husebo BS. The interactive relationship between pain, psychosis, and agitation in people with dementia: results from a cluster-randomised clinical trial. *Behav Neurol*. 2016;2016:1–8.
17. Reid MC, Eccleston C, Pillemer K. Management of chronic pain in older adults. *BMJ*. 2015;350:h532.
18. Hartikainen S, Mantyselka P, Louhivuori-Laako K, Enlund H, Sulkava R. Concomitant use of analgesics and psychotropics in home-dwelling elderly people-Kuopio 75+ study. *Br J Clin Pharmacol*. 2005;60(3):306-310.
19. Jyrkka J, Enlund H, Korhonen MJ, Sulkava R, Hartikainen S. Patterns of drug use and factors associated with polypharmacy and excessive polypharmacy in elderly persons: results of the Kuopio 75+ study: a cross-sectional analysis. *Drugs Aging*. 2009;26(6):493-503.
20. Simoni-Wastila L, Yang HK. Psychoactive drug abuse in older adults. *Am J Geriatr Pharmacother*. 2006;4(4):380-394.
21. Pokela N, Bell JS, Lihavainen K, Sulkava R, Hartikainen S. Analgesic use among community-dwelling people aged 75 years and older: a population-based interview study. *Am J Geriatr Pharmacother*. 2010;8(3):233-244.
22. Hartikainen SA, Mantyselka PT, Louhivuori-Laako KA, Sulkava RO. Balancing pain and analgesic treatment in the home-dwelling elderly. *Ann Pharmacother*. 2005;39(1):11-16.
23. Hamina A, Taipale H, Tanskanen A, Tolppanen AM, Tiihonen J, Hartikainen S. Differences in analgesic use in community-dwelling persons with and without Alzheimer's disease. *Eur J Pain*. 2017;21(4):658-667.
24. Abdulla A, Adams N, Bone M, et al. Guidance on the management of pain in older people. *Age Ageing*. 2013;42(suppl 1):i1-i57.
25. Girard P, Sourdet S, Cantet C, de Souto BP, Rolland Y. Acetaminophen safety: risk of mortality and cardiovascular events in nursing home residents, a prospective study. *J Am Geriatr Soc*. 2019;67(6):1240-1247.
26. The Norwegian Directorate of Health. *National Counselor for the Use of Opioids for Long-Term Non-Cancer-Related Pain* [In Norwegian]. Oslo: The Norwegian Directorate of Health; 2016. https://www.helsedirektoratet.no/veiledere/opioider. Accessed May 1, 2021.
27. Erdal A, Flo E, Aarsland D, et al. Tolerability of buprenorphine transdermal system in nursing home patients with advanced dementia: a randomized, placebo-controlled trial (DEP.PAIN.DEM). *Clin Interv Aging*. 2018;13:935-946.
28. Lovdata 2011: *Act on Municipal Health and Care Services* [in Norwegian]. Oslo: helse og omsorgstjenesteloven. https://lovdata.no/dokument/NL/lov/2011-06-24-30. Accessed May 1, 2021.
29. Norwegian Institute of Public Health. *WHO Collaborating Centre for Drug Statistics Methodology*. Oslo: Norwegian Institute of Public Health; 2021. https://www.whocc.no/atc_ddd_index/. Accessed May 1, 2021.
30. Lornstad MT, Aaroen M, Bergh S, Benth JS, Helvik AS. Prevalence and persistent use of psychotropic drugs in older adults receiving domiciliary care at baseline. *BMC Geriatr*. 2019;19(1):119.
31. Lyketsos CG, Galik E, Steele C, et al. The general medical health rating: a bedside global rating of medical comorbidity in patients with dementia. *J Am Geriatr Soc*. 1999;47(4):487-491.
32. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist*. 1969;9(3):179-186.
33. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975;12(3):189-198.
34. Shulman KI. Clock-drawing: is it the ideal cognitive screening test? *Int J Geriatr Psychiatry*. 2000;15(6):548-561.
35. Jorm AF. The informant questionnaire on cognitive decline in the elderly (IQCODE): a review. *Int Psychogeriatr*. 2004;16(3):275-293.
36. Hughes CP, Berg L, Danziger WL, Coben LA, Martin RL. A new clinical scale for the staging of dementia. *Br J Psychiatry*. 1982;140:566-572.
37. O'Bryant SE, Waring SC, Cullum CM, et al. Staging dementia using clinical dementia rating scale sum of boxes scores: a Texas Alzheimer's research consortium study. *Arch Neurol*. 2008;65(8):1091-1095.
38. Cummings JL. The neuropsychiatric inventory: assessing psychopathology in dementia patients. *Neurology*. 1997;48(5 suppl 6):S10-S16.
39. Engedal K, Haugen P, Gilje K, Laake P. Efficacy of short mental tests in the detection of mental impairment in old age. *Compr Gerontol A*. 1988;2(2):87-93.
40. Nesset M, Kersten H, Ulstein ID. Brief tests such as the clock drawing test or Cognistat can be useful predictors of conversion from MCI to dementia in the clinical assessment of outpatients. *Dement Geriatr Cogn Dis Extra*. 2014;4(2):263-270.
41. Engedal K, Haugen PK. The prevalence of dementia in a sample of elderly norwegians. *Int J Geriatr Psychiatry*. 1993;8(7):565-570.
42. Selbaek G, Kirkevold O, Sommer OH, Engedal K. The reliability and validity of the Norwegian version of the neuropsychiatric inventory, nursing home version (NPI-NH). *Int Psychogeriatr*. 2008;20(2):375-382.
43. The ICD-10 Classification of Mental and Behavioural Disorders. http://www.who.int/classifications/icd/en/GRNBOOK.pdf. Accessed May 1, 2021.
44. IBM Corp. *IBM SPSS Statistics for Windows, Version 26.0*. Armonk, NY: IBM Corp; 2019.
45. SAS Institute Inc. *SAS/ACCESS® 9.4 Interface to ADABAS: Reference*. Cary, NC: SAS Institute Inc.; 2013.
46. Kaye AD, Baluch A, Scott JT. Pain management in the elderly population: a review. *Ochsner J*. 2010;10(3):179-187.
47. Sarganas G, Buttery AK, Zhuang W, et al. Prevalence, trends, patterns and associations of analgesic use in Germany. *BMC Pharmacol Toxicol*. 2015;16:28.
48. Tevik K, Selbæk G, Engedal K, Seim A, Krokstad S, Helvik A-S. Factors associated with alcohol consumption and prescribed drugs with addiction potential among older women and men – the Nord-Trøndelag health study (HUNT2 and HUNT3), Norway, a population-based longitudinal study. *BMC Geriatr*. 2019;19(1):113.
49. Campbell CI, Weisner C, Leresche L, et al. Age and gender trends in long-term opioid analgesic use for noncancer pain. *Am J Public Health*. 2010;100(12):2541-2547.
50. Lovheim H, Karlsson S, Gustafson Y. The use of central nervous system drugs and analgesics among very old people with and without dementia. *Pharmacoepidemiol Drug Saf*. 2008;17(9):912-918.
51. Reid MC, Henderson CR Jr, Papaleontiou M, et al. Characteristics of older adults receiving opioids in primary care: treatment duration and outcomes. *Pain Med*. 2010;11(7):1063-1071.
52. The Norwegian Directorate of Health. *National Counselor for the Use of Drugs with Addiction Potential* [in Norwegian]. Oslo: The Norwegian Directorate of Health; 2015. https://www.helsedirektoratet.no/veiledere/vanedannende-legemidler. Accessed May 1, 2020.
53. Dumas EO, Pollack GM. Opioid tolerance development: a pharmacokinetic/pharmacodynamic perspective. *AAPS J*. 2008;10(4):537-551.
54. Gallagher P, Ryan C, Byrne S, Kennedy J, O'Mahony D. STOPP (screening tool of older Person's prescriptions) and START (screening tool to alert doctors to right treatment). Consensus validation. *Int J Clin Pharmacol Ther*. 2008;46(2):72-83.

55. O'Mahony D, O'Sullivan D, Byrne S, O'Connor MN, Ryan C, Gallagher P. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. *Age Ageing*. 2015;44(2):213-218.
56. Husebo BS, Ostelo R, Strand LI. The MOBID-2 pain scale: reliability and responsiveness to pain in patients with dementia. *Eur J Pain*. 2014;18(10):1419-1430.
57. Kang Y, Demiris G. Self-report pain assessment tools for cognitively intact older adults: integrative review. *Int J Older People Nurs*. 2018;13(2):e12170.

How to cite this article: Tevik K, Benth JŠ, Aarøen M, Lornstad MT, Bergh S, Helvik A-S. Prevalence and persistent use of analgesic drugs in older adults receiving domiciliary care at baseline—A longitudinal study. *Health Sci Rep*. 2021;4:e316. https://doi.org/10.1002/hsr2.316