

Association of Anemia with Pressure Ulcers, Falls, and Hospital Admissions among Long-term Care Residents

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ABSTRACT

PURPOSE: To evaluate the association between anemia and the clinical endpoints of pressure ulcers, falls, and hospital admissions in long-term care residents.

METHODS: Data were derived retrospectively from the AnalytiCare (Glenview, IL) proprietary database, containing laboratory data and detailed resident health status and condition indicators available in the Minimum Data Set (MDS) reports for 27 long-term care facilities in Colorado during January 1, 2007-September 15, 2008. Eligible residents had >90 days in the facility and a hemoglobin (Hb) value within 90 days of the earliest nonadmission (index) MDS. Anemia was defined as Hb <12 g/dL female, <13 g/dL males. Pressure ulcers were identified from the index MDS. Falls and hospital admissions were identified from all postindex MDS assessments. Logistic regression, adjusted for other covariates, was used to analyze the relationship between anemia and Hb level with the rate of pressure ulcers, falls, and hospital admissions.

RESULTS: There were 838 residents who met inclusion criteria. Mean age was 78 years, 67% were female. Nine percent had pressure ulcers. Pressure ulcers increased from a rate of 6% for residents with Hb levels ≥ 13 g/dL to 21% for those with Hb <10 ($P < .001$). In the logistic regression model, anemia was associated with an odds ratio of 2.23 for pressure ulcers (95% confidence interval, 1.32-3.78, $P = .003$). Having anemia was associated with a 58% higher odds of falls ($P = .012$) and 134% higher odds of hospital admissions ($P < .001$). Risk of falling and hospital admissions centered on those having Hb levels from 10 to <12 g/dL.

CONCLUSION: Consistent with previous research and subject to study design limitations, anemia in the residents studied was associated with statistically significant higher odds of pressure ulcers, falls, and hospital admissions.

KEYWORDS: Anemia; Fall; Hospital; Long-term care; Nursing home; Pressure ulcer

Anemia has been shown to be associated with reduced quality of life, decline in physical functioning and mobility, increased risk of falls, increased risk of dementia and depression, and increased morbidity and mortality in older adults.¹⁻⁴ In the US, starting in the year 2015, relative to younger age groups, the greatest population increases will be seen for persons 65 years and older.^{3,5} As the population of elders expands, the prevalence of anemia and its impact on health, and related expenditures are likewise expected to increase.²

Anemia has been shown to be a common problem in long-term care (LTC) facilities (ie, institutions that provide comprehensive rehabilitative skilled medical and nursing care services for residents requiring these services and living within such facilities, either for a limited stay after hospital discharge or over a longer period, often spanning one's remaining years of life). In a review of 3 studies,⁶⁻⁸ Gaskell et al⁹ reported an average anemia rate of 47%. Robinson et al¹⁰ reported an anemia rate of 60% across a chain of LTC facilities in the US.¹⁰ A recent study¹¹ reported an anemia rate of 56% across 40 nursing homes.

Anemia has been linked to higher mortality in nursing home residents. Van Dijk et al¹² found that anemia was an independent risk factor that predicted a 17% increase in the odds of resident mortality in a multivariate model, although this association disappeared in a second model that added an activities of daily living score. Berry et al¹³ found that, for those LTC residents who experienced hip fracture, prefracture anemia was associated with a 60% higher risk of mortality following the fracture.

CLINICAL ENDPOINTS

Pressure Ulcers

The overall prevalence of pressure ulcers has been reported at 12%-14%¹⁴ across US health care facilities, 12% across Belgian hospitals,¹⁵ and from 15%, 22%, 25%, and 30% in Canadian community care, mixed health, acute, and nonacute care settings, respectively.¹⁶ Twenty years ago, Allman¹⁷ found that approximately 60,000 people die annually in the US from pressure ulcer complications. Anemia has been implicated as a pathophysiologic factor for the development of pressure ulcers.¹⁸⁻²⁰ In the LTC facility, pressure ulcers are considered a serious and costly medical condition and an important measure of the quality of clinical care delivered.²¹⁻²³ In the LTC environment, the prevalence of pressure ulcers has been reported in various studies, ranging from 2.6% to 24%.²⁴⁻²⁶ In a recent study of a nationally representative nursing home database, Park-Lee and Caffrey²⁶ found that 11% of residents had pressure ulcers. In his review, Smith²⁷ found that 17% to 35% of residents had pressure ulcers at the time of admission to the nursing home.

Falls

Falls are prevalent in LTC facilities, occurring at a rate of 1.5 falls per LTC bed-year.²⁸ Of these, 10%-25% result in hospital admission or fractures.²⁸ Penninx et al²⁹ found, in community-dwelling persons in The Netherlands, that late-life anemia is common and is associated with twice the risk of recurrent falls. Several recent studies have cited a relationship between anemia and falls in hospitalized ambulatory older adults,³⁰ community and nursing home residents hospitalized for hip fracture,³¹ and in nursing home residents.¹¹

Hospital Admissions

In a community-based sample of persons 71 years of age and older, Penninx et al³² found that anemia predicted 23% greater risk of hospitalization ($P = .001$) and 63% greater risk of mortality ($P < .001$). Sharma

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