Relationship Between Health Care Costs and Very Low Literacy Skills in a Medically Needy and Indigent Medicaid Population

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Objectives: Previous research established that low literacy is independently associated with poorer health. Our objective was to determine whether low literacy skill also is associated with higher health care charges.

Methods: We studied persons enrolled in Medicaid because of medical need/indigence by testing literacy skills in English or Spanish and measuring annual health care charges. Statistical analyses determined if, after adjusting for sociodemographic variables, literacy was associated with charges.

Results: Mean charges among subjects with very low literacy skills (<3rd-grade reading level) were $10,688/year, but only $2,891 for those with better literacy skills (>4th-grade reading level), statistically significant difference (P = .025). This difference persisted after adjustment for potentially confounding sociodemographic variables.

Conclusions: Based on this small study, very limited reading skills seem to be independently associated with higher health care charges among medically needy and medically indigent Medicaid patients.

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Each subject underwent a literacy skills test using the Instrument for the Diagnosis of Reading (IDR), which is an English-Spanish instrument; subjects were tested in their preferred language. IDR yields scores from 0 to 8, corresponding to grade-equivalent reading levels; a score of 8 indicates 8th-grade level.

We categorized subjects with IDR scores ≤ 3rd-grade level as having low reading skills and those with scores ≥ 4th-grade level as having higher-level skills. There were 2 reasons for selecting this cutoff level. First, prior studies indicated that health knowledge and health status indicators are particularly poor for subjects with reading skills at or below the 2nd- or 3rd-grade level. Second, the most widely used health literacy assessment instruments categorizes subjects as being in the lowest level of literacy if reading skills are ≤ 3rd-grade level.

Measuring Health Care Charges
We used health plan billing records to tabulate charges for subjects’ medical care, which included hospital, emergency department, short-term nursing home, and physician care, plus outpatient and inpatient charges for laboratory, radiographs, pharmacy, and durable medical equipment. These were summed to yield “total charges.”

Demographic Variables
During the interviews, we collected information on each subject’s age, self-reported ethnic group, health status, and education level. Health status was measured by asking subjects for a self-assessment of their health (excellent, good, fair, poor).

Data Analysis
Using SAS software, we performed t tests to measure differences in health care costs between subjects with low- and high-level reading groups, as defined above. We then performed a multivariable analysis to determine whether literacy was a predictor of costs after considering age, ethnic group, health status, and education level.

Results
Subjects
There were 74 MNMI subjects, representing 18% of the original 402 subjects, the remainder of whom were enrolled in the Medicaid program through eligibility criteria other than MNMI. The subjects ranged in age from 21 to 77 (mean age of 49.9 ± 13.7) and had completed a mean ± S.D. of 9.1 ± 4.0 years of education, with a range of 0 to 13. Table 1 displays other demographic characteristics of subjects.

Reading Levels and Charges for Health Care
The subjects’ mean reading level was at grade 5.4 (± 2.7). Eighteen (24%) had IDR scores at low-literate levels (≤ 3rd-grade) and 56 (76%) at higher levels. The 18 low-level readers generated significantly higher annual mean total health care charges than the 56 higher level readers ($10,688 vs $2,891; P = .025). This difference was caused principally by differences in inpatient care charges ($7,038 vs $824, P = .020) (Table 2).

The multivariable analysis revealed that reading level was still a significant predictor of costs, even after considering age, ethnic group, and health status (P = .037). In a second analysis that excluded reading level but retained education level, educa-
tion level was not a significant predictor of health care charges ($P = .09$).

**Discussion**

The key finding of this study is that persons with low-literacy skills generate higher charges for health care than do persons with better reading skills. The difference was large, statistically significant, and clinical meaningful. It supports results of other research, which has found that persons with limited literacy skills have poorer health status, are more apt to be hospitalized, and make more visits to emergency rooms than their more literate counterparts. Indeed, one analysis has suggested that excess hospitalizations and other ramifications of limited literacy cost the US health care system between $50$ to $73$ billion per year.\(^\text{18}\)

The key finding of the study is supported by the multivariable analysis, in which literacy was a predictor of health care costs independent of the other sociodemographic variables that we measured. Furthermore, all subjects in this study were Medicaid enrollees and, as such, they were mostly unemployed or employed at low-paying jobs, indicating that they all had similar socioeconomic status.

Nonetheless, for several reasons, the results of this study are preliminary. First, they are based on secondary analyses of a larger data set from a previous study. Second, the findings are based on data from a small numbers of subjects, raising the possibility that the higher costs found in the low-literacy group could have been attributable to the chance occurrence of high-cost illness in a few subjects. Third, there may have been other factors, not measured in this study, that contributed to health costs. Thus, additional investigation is needed to confirm the results of this study, and to further explore the basis of the relationship between literacy and health care costs.

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**References**


