

Factors Supporting Discharge Referral Decision Making

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Prepared in April 2010

Background

- A *post-discharge referral* is a recommendation that the evaluating staff nurse, physical therapist, social worker, or physician refer the patient for post-hospital services such as skilled home care, outpatient rehabilitation, or admission to a nursing home or rehabilitation center/skilled nursing facility

Background

- Each year more than 12 million hospital discharge referral decisions are made for Medicare recipients
- There are no national, empirically-derived guidelines for these decisions
- Purposes of this study are to
 - Elicit expert knowledge about important referral factors
 - Use this information to predict which patients need a post-discharge referral

Methods

- Exploratory data analysis
- Mixed methods
 - Focus groups
 - Case studies
 - Delphi for knowledge elicitation
- Qualitative analysis and data mining used to identify variables for the logistic regression predictive model (refer/don't refer)

Sample

- 355 older adults hospitalized for a variety of medical and surgical conditions and admitted to one of six different sites
 - Cases included cardio (205), respiratory (43), digestive (45), and a mix of others
- Needed a larger sample than projected to assure enough non-referrals
- Case studies developed based on patient medical records
 - Instruments for self-rated health status, mental status, functional status, depression (not for all patients)

Example Case Study

- Age/Gender/Race: The patient is a 78 year-old, white, male.
- Health State: The patient was admitted for shortness of breath, coughing, and chest tightness. A chest x-ray was performed and his diagnosis was pneumonia and exacerbation of COPD. He was admitted and treated with IV antibiotics and nebulizer treatments. Past medical history is significant for coronary artery disease, atrial fibrillation, COPD, hypercholesterolemia, and diabetes mellitus secondary to steroid use. Medications prior to this admission include Aspirin, Cartia, Combivent, Coumadin, Digoxin, Flovent, Nitrostat, and Augmentin (for the last 2 days). Discharge medications included Levaquin and Glucotrol. Length of stay was 3 days.

Case Study - continued

- **Developmental State:** The patient attended school until the 10th grade. He is retired. He scored 9/10 on the mental status exam and 9 on the depression scale (16-60 = depression). He is independent in all activities of daily living. He has no health aids and does not feel that he needs any. He has no dietary restrictions. He reports fatigue and shortness of breath while dressing, walking, and bathing. He rated his health as fair at the present time. He has not used any formal health services and does not feel he needs any.
- **Health Care System Factors:** The patient has had no hospitalizations in the past six months. He saw his doctor twice in the past six months.

Case Study - continued

- **Family System Factors:** The patient is married and lives with his spouse. He considers his wife and son to be his primary caregivers. They are available whenever needed.
- **Environmental Factors:** The patient lives in a single-family home. There is a bathroom on the level of the bedroom and kitchen. The kitchen and bedroom are on the same level.
- **Socioeconomic Factors:** The patient reports his income as \$5,000-10,000/year and is insured by Medicare Parts A and B and private health insurance.

Expert Knowledge Elicitation

- Four nationally recognized scholars and four local clinicians evaluated the cases
- All experts evaluated all cases online, indicating whether or not a referral was needed, and the factors that influenced their decision
- Three Delphi rounds were used to reach consensus
- Focus groups held with local and national experts to review results, discuss the referral factors, and validate the logic

Results

- Sample: 54% female, 75% white, ave. age 74 (65-90), 50% married, 36% widowed; 33% High School, 30% < H. S.; 43% income <\$20k; 53% 1+ hospitalization in last 6 months
- Experts recommended 80% (n=284) of the sample for a post-discharge referral
 - 81% to home care, 8% outpatient rehab, 11% inpatient rehab

Logistic Regression

- Logistic regression is used to predict the probability of an event by fitting data to a logistic curve
- Like linear regression, it makes use of predictor or independent variables
- It is used extensively in the medical sciences and in marketing applications
 - E.g., predicting the likelihood that a customer will buy a product or renew a subscription

Logistic Regression

- The experts use the data in each model and the consensus recommendation
 - 1 for referral, 0 for none
- Then, we solve each model for regression coefficients, as in linear regression
- The output for each patient is a probability of referral
- This provides a systematic mechanism for scoring patients

Model 1 Results

- Experts more likely to refer patients who had ($p < 0.05$):
 - Major walking restrictions
 - Less than excellent self-rated health
 - In hospital > 1 week
 - 80 years old or older
 - Higher depression scores
 - Higher number of co-morbidities

Model 2 Results

- Second model, without depression scores
- Walking function, self-rated health, length of hospital stay, and number of co-morbidities still significant
- Help available and mental health score also important
 - Can use these two factors if depression scores not available

Observations

- Depression, mental status, and self-rated health are not routinely collected, but this study points to their importance
- Model does well in predicting who should be referred, but not as well in predicting those who should not – possibility of overreferral should be addressed from quality and cost considerations
- Study limited to subjects from acute care hospitals in SE PA who are in at-risk patient groups, cognitively intact, and expected to be discharged home

Conclusions

- This study defines the information needed to predict hospitalized older adults in need of post-discharge services
- By assuring the systematic, valid, and reliable collection of six items (for each model), the multidisciplinary team is alerted to patients in need of services