

# **Fighting Polypharmacy - From Theory to Practice :**

## **A Rational, Cost Effective Approach for Improving Drug Therapy in Disabled Elderly People**

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### Introduction:

The extent of drug related problems in the elderly is alarming because this population uses a significantly higher number of medications as people in other age groups and also have an increased rate of drug interactions and hospitalizations secondary to drug related problems. The extent of the problem is even greater in nursing homes (NH) and nursing departments (ND) and the financial consequences are enormous. Our research hypothesis was that in NH/ND, the sum total of negative impacts of polypharmacy, outweighs the sum total of the potential beneficial effects of all specific drugs. We presents a methodology for fighting polypharmacy and the results of its application.

### Methods:

Drug evaluation of patients in all patients of 6 geriatric ND was carried out in an attempt to stop as many drugs as possible. When no evidence based data existed for using a drug in our patient's age group and disability level, we were using only our clinical experience and judgment in order to decide whether the drug was really needed. Even when the indication seemed valid and relevant in disabled elders, and the benefit seemed to outweigh all possible adverse effects - we would have nevertheless consider dose reduction.

After 12 months, the results of drug discontinuation were tabulated for: the rate of success of any change in medications, death rate, acute care facility referrals, and cost reduction.

Patients of another four ND of the Soham Geriatric Medical Center were used for the financial comparison and were defined as the control departments.

## Results:

The average number of medications consumed by patients in the six ND was 7.09. A total of 332 different drugs were discontinued in 119 patients (an average of 2.8 drugs per patient).

The control group was composed of 71 patients of comparable age, sex and co-morbidities who have been treated by the same multidisciplinary team in the same 6 ND (Table 1). In most patients, nitrates, pentoxifylline, H2 blockers, potassium & iron supplements and more than one anti hypertensive drug, could be discontinued safely (Table 2). The overall rate of drug discontinuation failure was 18% of all patients and 10% of all drugs.

Discontinuation of drugs was not associated with any significant adverse effects. The one year mortality rate and the patients' annual referral rate to acute care facilities were both significantly lower in the study as compared to the control group (Table 3).

Table 4 compares the average daily cost of drugs per patient between the six study ND and the four other control ND, before and after the intervention. There was an overall decrease in the cost of drugs in all departments of Shoham Geriatric Medical Center. This change is represented by the decrease of \$0.26 in the average daily cost per patient in the control ND but it did not reach statistical significance. However, in the six ND in which our intervention was performed, a statistically significant decrease of \$0.46 in the average daily cost of drugs per patient was shown.

## Conclusions:

In disabled patients in nursing departments, the sum total of the negative impacts of a variety of drug combinations, may outweigh the sum total of beneficial effects of the specific drugs.

Application of our methodology in disabled elders enables simultaneous discontinuation of several medications and yields a number of benefits: reduction in mortality rates and referrals to acute care facilities, lower costs and improved quality of living.

**Table No. 1. Demography and co-morbidities**

<b>Parameter</b>	<b>Study Group</b>	<b>Control Group No. 1</b>	<b>P - Value</b>
<b>Total Number</b>	<b>119</b>	<b>71</b>	<b>-</b>
<b>Female/Male</b>	<b>87/32</b>	<b>44/27</b>	<b>NS*</b>
<b>A G E (Mean ± SD) †</b>	<b>81.2 ± 8.3</b>	<b>82 ± 8.7</b>	<b>NS†</b>
<b>Dementia ‡</b>	<b>112 (94%)</b>	<b>66 (93%)</b>	<b>NS</b>
<b>Double Incontinence</b>	<b>111 (93%)</b>	<b>66 (92%)</b>	<b>NS</b>
<b>Indwelling Urinary Catheter</b>	<b>21 (18%)</b>	<b>10 (14%)</b>	<b>NS</b>
<b>Hypertension</b>	<b>55(46%)</b>	<b>29 (41%)</b>	<b>NS</b>
<b>Congestive Heart Failure</b>	<b>12 (10%)</b>	<b>5 (7%)</b>	<b>NS</b>
<b>Ischemic Heart Disease</b>	<b>23 (19%)</b>	<b>23 (32%)</b>	<b>0.042</b>
<b>Previous Myocardial Infarction</b>	<b>6 (5%)</b>	<b>9 (13%)</b>	<b>NS</b>
<b>Chronic Atrial Fibrillation</b>	<b>16 (13%)</b>	<b>14 (20%)</b>	<b>NS</b>
<b>Diabetes Mellitus</b>	<b>36 (30%)</b>	<b>17 (24%)</b>	<b>NS</b>
<b>Chronic Obstructive Lung Disease</b>	<b>6 (5%)</b>	<b>9 (13%)</b>	<b>NS</b>
<b>Previous Stroke (CVA)</b>	<b>45 (38%)</b>	<b>28 (39%)</b>	<b>NS</b>
<b>Hypo Albuminemia §</b>	<b>29 (24%)</b>	<b>18 (25%)</b>	<b>NS</b>
<b>Recurrent Infections   </b>	<b>35 (29%)</b>	<b>13 (18%)</b>	<b>NS</b>

\* - Not Significant. All parameters except Age, were analyzed employing the Chi-square test.

† - Students t - test

‡ Mini Mental State Examination (MMSE) 14/30 or less.

§ Serum albumin < 3.0 g/dL.

|| At least two proven infections in one year (UTI, pneumonia, skin infections etc.)

**Table 2. Success Rate According to Types of Drugs Discontinued**

<b>DRUG GROUP</b>	<b>No. of Patients Discontinuation</b>	<b>Recurrence of Symptoms/Signs (Failures)</b>	<b>Rate of Success (%)</b>
<b>Nitrates</b>	<b>22</b>	<b>0</b>	<b>100%</b>
<b>H2 Blockers</b>	<b>35</b>	<b>2</b>	<b>94%</b>
<b>Anti Hypertensives</b>	<b>51</b>	<b>9</b>	<b>82%</b>
<b>Diuretics (Furosemide)</b>	<b>27 (25)</b>	<b>4 (4)</b>	<b>85%</b>
<b>Pentoxifylline</b>	<b>15</b>	<b>0</b>	<b>100%</b>
<b>Potassium Supplement</b>	<b>20</b>	<b>0</b>	<b>100%</b>
<b>Iron Supplement</b>	<b>19</b>	<b>1</b>	<b>95%</b>
<b>Sedatives &amp; Tranquilizers</b>	<b>16</b>	<b>2</b>	<b>88%</b>
<b>Antidepressants</b>	<b>19</b>	<b>5</b>	<b>74%</b>
<b>Anti Psychotics</b>	<b>13</b>	<b>4</b>	<b>69%</b>

**Table 3. Annual rate of Deaths and Referrals to Acute Care Facilities**

	<b>Study Group</b>	<b>Control Group No. 1</b>	<b>P - Value</b>
<b>Total No.</b>	<b>119</b>	<b>71</b>	
<b>Deaths</b>	<b>25 (21%)</b>	<b>32 (45%)</b>	<b>0.001</b>
<b>Referrals to Acute Care Facility</b>	<b>14 (11.8%)</b>	<b>21 (30%)</b>	<b>0.002</b>

**Table 4. The Average Daily Cost of Drugs Per Patient in US dollars**

	<b>1-6/2002 Before the Study</b>	<b>1-6/2003 After the Study</b>	<b>Δ</b>	<b>P- Value***</b>
<b>Control group Department * (4 Wards)</b>	<b>1.65</b>	<b>1.39</b>	<b>0.26</b>	<b>0.07</b>
<b>Study Departments ** (6 Wards)</b>	<b>1.74</b>	<b>1.28</b>	<b>0.46</b>	<b>0.02</b>

**\* Four departments (132 patients) in which our new therapeutic approach was not applied in any of the patients.**

**\*\* Six departments in which our therapeutic approach was applied. The figures represent cost of drugs of 119 patients of the study group (63%), but include also cost of patients of the control group in whom no discontinuation of drugs was performed.**

**\*\*\* Chi-square test**