Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.
EFFECTS OF A MEDICATION REMINDER CALENDAR ON MEDICATION COMPLIANCE IN OLDER ADULTS

A thesis presented in partial fulfilment of the requirements for the degree of Master of Arts in Psychology at Massey University

June Barbara Greyvenstein
2001
ABSTRACT

The present study aimed to investigate whether the provision of an individualised medication reminder calendar would improve medication compliance, by acting as a cognitive aid for older adults, who may be suffering the mild memory deficits which tend to be the usual concomitants of normal ageing. The present study also examined medication compliance and error rates and their relationship with the amount of daily medication taken by participants, as well as with selected demographic and socio-economic factors. A convenience sample of community dwelling participants ($N = 50$), aged between 55 and 84 years ($M = 71$) who were prescribed an average of five daily medications, was randomly assigned to either calendar or control groups. Medication compliance was assessed via two pill counts conducted, on average, seven and a half weeks apart. The results showed that participants using the calendar and those in the control group did not differ in terms of compliance measures. The average rate of compliance with medication for the sample was 97%. The mean number of errors made by participants during the interval between pill counts was 19 (79% errors of omission and 21% errors of commission). Multivariate analysis indicated that the number of daily tablets taken was positively associated with the number and types of errors made. Women were less compliant than men, while participants of lower socio-economic status made more errors of commission. Discussion of these results focused on the non-representativeness of the sample and the difficulties associated with obtaining volunteers. Possible directions for future medication compliance research were discussed.
ACKNOWLEDGEMENTS

Firstly, I would like to express my indebtedness to my two supervisors, Dr. Nancy Pachana and Dr. Nik Kazantzis, who provided much needed emotional, practical and intellectual support during the conceptualisation, planning, execution and writing up of this research project.

Secondly, I am extremely grateful to the eighteen general practitioners who volunteered their assistance despite heavy work loads and a consequent singular lack of spare time.

A huge thank you is due to the research assistants who accompanied me on pill counting expeditions, especially to Jill Pratt, whose enthusiasm, diligence and importantly, competence in mental arithmetic, ensured accuracy during the lengthy data collection process. Her willingness to help, often at short notice, was greatly appreciated.

Thanks are also owed to my husband Peter and daughters Tenille and Zara, for their support during my years as a student. I hope I am forgiven for my ill temper when things did not proceed entirely as I had planned.

And finally, I would like to express my heartfelt thanks to the fifty marvellous participants who volunteered their time in order to help me with this project. It was a privilege to be welcomed into their homes and some of the baking I was able to sample was truly exceptional.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>ix</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>x</td>
</tr>
<tr>
<td>CHAPTER ONE : INTRODUCTION</td>
<td></td>
</tr>
<tr>
<td>Overview of medication compliance</td>
<td>1</td>
</tr>
<tr>
<td>Medication compliance and older adults</td>
<td>3</td>
</tr>
<tr>
<td>Age related physiological changes</td>
<td>3</td>
</tr>
<tr>
<td>Chronic diseases</td>
<td>5</td>
</tr>
<tr>
<td>Polypharmacy</td>
<td>6</td>
</tr>
<tr>
<td>Medication non-compliance as a cause for concern</td>
<td>7</td>
</tr>
<tr>
<td>Compliance levels among older adults</td>
<td>9</td>
</tr>
<tr>
<td>Compliance theories</td>
<td>13</td>
</tr>
<tr>
<td>CHAPTER TWO : REASONS FOR MEDICATION NON-COMPLIANCE</td>
<td></td>
</tr>
<tr>
<td>Demographic and socio-economic factors</td>
<td>16</td>
</tr>
<tr>
<td>Disappearance or lack of symptoms</td>
<td>20</td>
</tr>
<tr>
<td>Unpleasant side effects</td>
<td>21</td>
</tr>
<tr>
<td>Dissatisfaction with physician</td>
<td>22</td>
</tr>
<tr>
<td>Nature of the setting</td>
<td>23</td>
</tr>
<tr>
<td>Lack of knowledge about prescribed therapy or unclear instructions</td>
<td>23</td>
</tr>
<tr>
<td>Length of treatment regimen</td>
<td>25</td>
</tr>
<tr>
<td>Complexity of medication regimen</td>
<td>26</td>
</tr>
<tr>
<td>Physical and sensory deficits</td>
<td>27</td>
</tr>
<tr>
<td>Psychological problems</td>
<td>29</td>
</tr>
</tbody>
</table>
Cognitive deficits
Memory deficits

CHAPTER THREE : ASSESSMENT AND INTERVENTIONS

Assessment

Biochemical measures 34
Self report measures 35
Electronic and computerised compliance monitoring 35
Pill counting 36
Prescription refill records 37
Therapeutic outcome 37
Conclusion 38

Interventions

Medication regimen simplification 39
Pharmacist monitoring of regimen 39
Improving communication in the doctor/patient relationship 40
Improving knowledge and providing clear instructions 40
Improved labelling and packaging 41
Reducing the cost of medication 42
Reinforcement 43
Memory training and Aids 43

CHAPTER FOUR : OBJECTIVES OF THE PRESENT STUDY

The ageing population 46
Aims of the present study 50
Specific research questions and hypotheses 51
Average overall compliance rates 52
Relationship between amount of daily medication and compliance 52
Demographic and socio-economic factors 52
Strategies for remembering to take medication 53
Usefulness of Medication Calendars 53
CHAPTER FIVE : METHOD

Sample 54
  Selection Criteria 54
  Participant Recruitment Procedure 54
  Ethical Issues Concerning Participants 56
Research Design 56
  Design and Allocation to Groups 56
  Measurement of Medication Compliance 57
  Compliance assessment : Pill Counting 58
Materials and Apparatus 58
Data Collection Procedures 60
  Collection of Prescription Medication Information 60
  Collection of Medication Compliance Information 60
  Sample characteristics 62
Statistical Analyses Procedures 65
  Main Hypothesis 65
  Subsidiary Hypotheses 66

CHAPTER SIX : RESULTS

Aims and Objectives 69
Main Hypothesis 69
  Average compliance ratio 69
  Total error rate 70
Subsidiary Hypotheses 71
  Overall mediation compliance rates 71
  Relationship between amount of daily medication and compliance 71
  Demographic and socio-economic factors 72
    Compliance deviation score 74
    Total error rate 75
    Errors of omission and commission 76
Strategies For Remembering to Take Medication 78
Reported Usefulness and Ease of Use of Medication Calendars 79
CHAPTER SEVEN: DISCUSSION

Overview
Main hypothesis 82
Subsidiary topics 83
  Average overall compliance rates 83
  Relationship between amount of daily medication and compliance 86
  Demographic and socio-economic factors 87
  Strategies for remembering to take medication 88
  Usefulness of medication calendars 89

Methodological Issues and Limitations of the Present Study 91
  Sample issues 91
  Participant recruitment method 92
  Difficulty with the pill counting procedure 93
  Use of Compliance Ratio 94
  The Hawthorne Effect 95

Suggestions For Future Research 95
  Physically Infirm and Cognitively Impaired Older 96
  Research into timing of medication intake 97
  Reasons for non-compliance with Medication 98
  Non-prescription medication 99

Conclusion 99

REFERENCES 100 - 117

APPENDICES

Appendix A: 118
  Invitation letter to general practitioners
  Registration of interest form for general practitioners
  Information sheet for participants
  Consent forms for participants
Appendix B:
Drug Inventory form
Sociodemographic questionnaire
General questionnaire

Appendix C:
Thank you letter and Summary of Findings for General Practitioners
Thank you letter and Summary of Findings for Participants
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Examples of Medication Compliance Studies Listed According to Year Published</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Education qualifications of study participants ($N = 50$)</td>
<td>63</td>
</tr>
<tr>
<td>3</td>
<td>Categories of drugs prescribed to participants and associated number and types of medication errors ($N = 50$)</td>
<td>64</td>
</tr>
<tr>
<td>4</td>
<td>Intercorrelations between Independent Variables</td>
<td>73</td>
</tr>
<tr>
<td>5</td>
<td>Regression co-efficients for Multivariate Model Using Compliance Deviation Score as the Dependent Variable</td>
<td>74</td>
</tr>
<tr>
<td>6</td>
<td>Regression co-efficients for Multivariate Model Using Total Error Rate as the Dependent Variable</td>
<td>75</td>
</tr>
<tr>
<td>7</td>
<td>Regression co-efficients for Multivariate Model Using Errors of Omission as Dependent Variable</td>
<td>77</td>
</tr>
<tr>
<td>8</td>
<td>Regression co-efficients for Multivariate Model Using Errors of Commission as Dependent Variable</td>
<td>78</td>
</tr>
<tr>
<td>9</td>
<td>Methods Used by Study Participants to Remember to Take their Daily Medication ($N = 50$)</td>
<td>79</td>
</tr>
<tr>
<td>10</td>
<td>Participant Responses to the Question “On a Scale of 1 – 7, please rate how useful you found the medication calendar to be”</td>
<td>80</td>
</tr>
<tr>
<td>11</td>
<td>Participant Responses to the Question “On a Scale of 1 – 7, please rate how easy you found the medication calendar to use”</td>
<td>81</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Example of a medication calendar</td>
<td>59</td>
</tr>
</tbody>
</table>