

EVALUATION OF COST AND DAILY DRUG DOSE OF FLUOXETINE AND SERTRALINE IN GENERAL HOSPITAL PULAU PENANG MALAYSIA

TAHIR MEHMOOD KHAN^{*1}, SYED AZHAR SYED SULAIMAN², MOHAMED AZMI HASSALI³

Background : SSRIs are generally the first-line medication for depression because of the few side effects in comparison to other medicines used for depression.

Aim: To evaluate the cost of SSRIs in Penang general hospital Malaysia

Methodology : On December 2007 a retrospective and prospective study of pharmacy records (Jan 2006- Feb 2007) were done in order to calculate the cost of Selective serotonin reuptake inhibitors (SSRIs). Prescription trending for SSRIs was sought through patient's medical records from (Jan 2002 – Dec 2007). Daily drug dose was calculated by following the WHO guidelines.

Results : In comparison to the cost in 2006 and 2007 it shows a massive increase in direct cost of SSRIs in 2007. In 2006 cost of Fluoxetine and Sertraline were 50,063.00USD while in 2007 it increased up to 58.39 % (79,297.00USD).

Conclusion : Cost of SSRIs (Fluoxetine and Sertraline) in 2007 has increased about 1/2 of the cost of (Fluoxetine and Sertraline) in 2006; this noticeable increase reflects increase in the prevalence of depression.

Keywords : SSRIs, Cost, Prescription trending, Fluoxetine, Sertraline.

INTRODUCTION

Management of depression is expansive issue to discuss while estimating cost. By 2020 depressive disorders are expected to be the second highest cause of disease burden worldwide.^{2,3} Approximate annual cost of depression in the United States was \$43.7 billion, \$12.4 billion of this was attributable to direct costs, and \$31.3 billion was to indirect cost¹. Total direct medical costs of depression in three years 2000, 2001, and 2002 in Taiwan was approximately US\$ 93 million, US\$ 117 million, and US\$140million respectively, confirming a noticeable increase every year. However, the percentage of patients receiving treatment was almost same, with a treatment rate of 1.5% in 2000, 2.3% in 2001, and 2.0% in 2002. Depression therapy cost annually 116.6 million US\$ in Taiwan (Agnes 2006)⁶. Finding of survey conducted in South East Asian Region (SEAR), show a high rate of depression with a lifetime risk of 7-12 % for men and 20-25 % for women⁴. Previous studies in the rural areas of Malaysia demonstrate 3.6% point prevalence of the mental disorders (Malaysian Psychiatric Association Consensus Statement)⁵ with a prevalence rate of 10.7% among adults. Keeping in view the therapy of depression an effort was made to calculate the cost of medicines used to manage depression as the first line of therapy. SSRIs are generally the first-line medication for depression because of the few side effects in comparison to other medicines used for depression⁷.

The main aim of this study is to evaluate the direct cost of SSRIs in the public general hospital in the state of Penang

Malaysia.

METHODOLOGY

In 2004 and 2005 the Ministry of health Malaysia conducted a national medicine use survey (NMUS)^{14,16} among all the states in Malaysia. NMUS provides data of daily drug dose of medicines used in Malaysia, but for every individual state no data is available regarding daily drug dose of Selective serotonin reuptake inhibitors (SSRIs). An effort was made in Dec 2007 by conducting a retrospective and prospective study in the Psychiatry Out patient department Penang general hospital (GH). Penang GH was the only public hospital included in NMUS 2004 and 2005^{14,16}, eight private hospitals were also involved in NMUS but they refused to participate in this study. Before commencing study approval from the ethical committee Ministry of health Malaysia and clinical research committee GH Penang was obtained. Patient record of the last five years (Jan-2002-dec2007) was reviewed in order to identify the prescription pattern for all antidepressants. Drugs prescribed were noted and listed properly according to their pharmacological actions. Keeping in view the aim of study, a list for SSRIs was designed and submitted to the main drugs store for approval from chief pharmacist.

Pharmacy records show complete retrospective and prospective data of two years 2006 and 2007 only; keeping in view this limitation of data two years 2006 and 2007 which was reviewed in order to calculate the direct cost of SSRIs. Variables considered while collecting data were

*Corresponding author: ¹ School of pharmacy, University Sains Malaysia. Pulau Penang.

_____ ²School of pharmacy, University Sains Malaysia. Pulau Penang.

³School of pharmacy, University Sains Malaysia. Pulau Penang. e-mail: tahir khan.fm07@student.usm.my

number of packs purchased, cost per pack and cost per unit dose. Cost of medications calculated by cross multiplication of rows and columns, in MS EXCEL® 2003 version using the following formula

$$f_{x=MMULT(A(1,2,...):B(1,2,...):Z(1,2,...)) \dots \dots \text{eq}(1)}$$

MMULT = the function of multiplication in MS excel.

A, B, till Z are the columns. And (1,2,...): are the number of column.

The cost of SSRIs is then further converted to USD by using 3.2 as a conversion factor. Latter on daily drug dose (DDD) of Fluoxetine and Sertraline was calculated by using DDD formula from WHO guidelines.¹⁵ This formula was previously used by the ministry of health in 2005^{14,16}

Formula for daily drug dose is as follow:

$$\text{DDDs}/1000 \text{ inhabitants}/\text{day} = \frac{T * 1000}{\text{DDD} * P * 365} \dots \dots \text{eq}(2)$$

Where T is an estimate of the total quantity of the drug utilized in the year under consideration (strength of tablet x number of tablets) DDD is the DDD assigned for the drug according to the ATC/DDD system P is the mid-year population of Malaysia or the relevant area where the survey was conducted 365 refers to the 365 days in a year. The percentage increase in the cost of Fluoxetine and Sertraline was calculated by using eq-3

Percentage increase in Direct cost of SSRIs in 2007

$$= \frac{A - B}{C} * 100 \dots \dots \text{eq}(3)$$

RESULTS

Findings show that the most commonly prescribed SSRIs were Fluoxetine 20mg Cap and Sertraline 50mg tab, the cost of these drugs calculated in Malaysian Ringgit (RM) and American dollar USD(\$). Data regarding to quantity purchased of SSRIs in 2006 and 2007 mentioned

in Table -3 Unit dose Cost of Fluoxetine and Sertraline in GH Penang mentioned in table 3.2. Cost of unit dose calculated on the basis of the minimum and the maximum dose range of flouoxetine and Sertraline.

DISCUSSION

In current practice SSRIs are considered as the first line of therapy for depression.⁷⁻⁹ It was observed that the cost of Fluoxetine and Sertraline increased remarkably in 2007.

The Penang GH has spent 25,125.00USD for the purchase of flouoxetine and 24,938.00USD for the purchase of Sertraline in 2007. Collective cost of Fluoxetine and Sertraline in 2006 was 50,063.00USD. But in 2007 this expenditure increase was up to 43,969.00USD for Fluoxetine and 35,328.00USD for Sertraline. Collectively the direct cost of Flouoxetine and Sertraline increased from 50,063.00USD (in 2006) to 79,297.00USD (in 2007), comparison (2006 Vs 2007) demonstrate 58.39% was the estimated increase in direct cost of Fluoxetine and Sertraline in 2007. eq 3 was used to calculate %age increase in cost in 2007.

% age increase in Direct cost of SSRIs in 2007

$$= \frac{A - B}{C} * 100 \dots \dots \text{eq}(3)$$

$$= \frac{79,297 - 50,063}{50063} * 100$$

$$= 58.39\%$$

A= Direct cost of SSRIs in 2007, B= Direct Cost of SSRIs in 2006, C= Total cost in 2006

To demonstrate data more evidently unit dose cost of Fluoxetine and Sertraline for a single patient was calculated on a daily/monthly and annual basis. The minimum and maximum prescribed dose limit of Fluoxetine and Sertraline was confirmed.^{10,11} Burden of unit dose of Fluoxetine and Sertraline was 0.9USD for Fluoxetine and 0.21 USD for Sertraline respectively. Theoretical monthly/

TABLE- 1 Direct cost of SSRIs in 2006 and 2007

Drug	Cost/pack	Quantity purchase (Pack) 2006	Cost in 2006 in RM and USD	Quantity purchase (Pack) 2006	Cost in 2007 in RM and USD
Fluoxetine 20mg Capsule(caps)	RM 80.40/28's	1000/28 caps	RM 80,400.00= 25125.00\$	1750/28 caps	RM1,40,700.00= 43969.00\$
Sertraline 50mg tablets(tabs)	RM 66.50/100's	1200/100 tabs	RM 79,800.00= 24,938.00\$	1700/100 tabs	RM1,13,050.00= 35,328.00\$
Total	-	2200	RM 1,60,200.00= 50,063.00\$	3450	RM 2,53,750.00= 79,297.00\$

Note: eq (1) was used.

TABLE- 2 Cost of Fluoxetine and Sertraline per unit dose in 2006 and 2007

Drug	Cost / tab In RM and USD	Starting Dose/day	Cost /day in RM and USD	Maximum Dose/day	Cost/day in RM and USD
Fluoxetine 20mg Cap	RM2.87=0.9\$	20mg	RM2.87=0.9\$	80mg	RM11.48=3.6\$
Sertraline 50mg tab	RM0.66=0.21\$	50mg	RM0.66=0.21\$	200mg	RM2.64=0.83\$

Note: eq (1) was used.

annual cost of Fluoxetine and Sertraline was calculated according to the minimum and maximum dose of Fluoxetine and Sertraline. Findings demonstrate for Fluoxetine minimum cost per month were 26.91USD while maximum cost per month were 107.5USD with mean cost per month = 80.66USD, the minimum cost per month of Sertraline were 6.19USD and maximum cost per month were 24.75USD with a mean cost of 15.47 USD. Medical records demonstrate frequently prescribed doses of Fluoxetine were 20mg (few treated with 20mg BD) and Sertraline were 50mg, keeping in view the prescribed dose of Fluoxetine and Sertraline the cost of therapy for one patient annually was approximately 322.99 USD for (Fluoxetine) and 74.28 USD for Sertraline. Calculation on these figures provide an evidence that 136 patients were treated with Fluoxetine and 475 patients treated with Sertraline in 2007, while in 2006; 77 patients were treated with Fluoxetine and 335 patients were treated Sertraline. (The cost of Fluoxetine and Sertraline in 2006 and 2007 also cover the cost of follow up from the year 2000).

Estimated Theoretical burden of SSRIs in Malaysia in year 2006 and 2007

According to the latest statistics¹² estimated population of Malaysia in 2007 was 27.17 million, the population of Penang (Island) in 2006 was 1, 49,2400.¹³ The expected population of Penang in 2007 with an increase rate of 0.8% was 150 thousand. In December 2007 total number of cases registered for depression (Jan2002- Dec 2007) was 400 with cost of 79,297.00USD for SSRIs (Fluoxetine and Sertraline). The estimated DDD of Fluoxetine and Sertraline for Pulau Penang are mentioned as follow:

(1) For Fluoxetine in 2007, 1750 (28tabs/pack) were consumed, so the DDD will be:

$$\begin{aligned} \text{DDDs/1000 inhabitants/day} &= T^* 1000 \dots \text{eq (1)} \\ &\text{DDD}^* P^* 365 \\ &= 20\text{mg} \times 49000 \times 1000 \\ &20\text{mg} \times 1500000 \times 365 \end{aligned}$$

$$= 0.09$$

(1) For Sertraline in 2007, 1200(100tabs/pack) were consumed, so the DDD will be:

$$\begin{aligned} \text{DDDs/1000 inhabitants/day} &= T^* 1000 \dots \text{eq (1)} \\ &\text{DDD}^* P^* 365 \\ &= 50\text{mg} 120000 \times 1000 \\ &50\text{mg} \times 1500000 \times 365 \\ &= 0.21 \end{aligned}$$

Estimated Direct Cost of SSRIs in GH Penang 2008

This estimation was based on a comparison between the direct cost of Fluoxetine and Sertraline in 2006 and 2007. In the Penang general hospital an increase in the direct cost of Fluoxetine and Sertraline was 58.39% in 2007, keeping in view this elevation rate possible direct cost of Fluoxetine and Sertraline in 2008 In the Penang general hospital will be about 125598 USD = 401915 RM.

Conclusion

Cost of SSRIs (Fluoxetine and Sertraline) in 2007 has increased to about 1/2 of the cost of (Fluoxetine and Sertraline) in 2006; this noticeable increase reflects the increase in prevalence of depression.

Limitations of study

This study covers only the cost of Fluoxetine and Sertraline in 2006 and 2007, direct cost of other antidepressants, physician time and indirect bear by patients are issue still need to be explored.

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