

THE TRUE COST OF RECYCLE SYRINGE COMPARED WITH DISPOSABLE SYRINGE AT SRINAGARIND HOSPITAL

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การเปรียบเทียบต้นทุนที่แท้จริงของกระบอกฉีดยาชนิดแก้ว กับชนิดพลาสติก

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**ภาควิชากุมารเวชศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น

ได้ศึกษาเปรียบเทียบต้นทุนที่แท้จริงของกระบอกฉีดยาชนิดแก้ว และชนิดพลาสติกที่ใช้ในโรงพยาบาลศรีนครินทร์ตลอดปี 2530 ต้นทุนที่แท้จริงประกอบด้วย ค่าแรง, มูลค่าปัจจุบันของเครื่องมือ เครื่องใช้ในการทำความสะอาดล้างและฆ่าเชื้อโรคของกระบอกฉีดยาชนิดแก้ว ตลอดจนค่าเสียหายที่เกี่ยวข้องในหน่วยจ่ายกลางของโรงพยาบาล, ผลการศึกษาพบว่าอัตราการใช้กระบอกฉีดยาชนิดแก้วทุกขนาดมีจำนวนเท่ากับ 698,484 ครั้ง/ปี ต้นทุนที่แท้จริงของกระบอกฉีดยาชนิดแก้วมีค่าเท่ากับ 566,632 บาทต่อปี ในขณะที่ต้นทุนของกระบอกฉีดยาชนิดพลาสติกมีมูลค่า 1,808,850 บาทต่อปี ตัวแปรที่สำคัญที่จะทำให้ต้นทุนของกระบอกฉีดยาชนิดแก้วสูงขึ้น คือ จำนวนการแตกชำรุดของกระบอกฉีดยาชนิดแก้ว และอัตราค่าแรงงานของเจ้าหน้าที่หน่วยจ่ายกลาง, อย่างไรก็ตามจากการวิเคราะห์ความไวพบว่าถ้าอัตราการแตกชำรุดของกระบอกฉีดยาชนิดแก้วเกินร้อยละ 600 หรือค่าแรงงานของเจ้าหน้าที่เพิ่มขึ้นเป็น 6 เท่าของอัตราในปัจจุบัน กระบอกฉีดยาชนิดพลาสติกจึงจะมีต้นทุนถูกกว่ากระบอกฉีดยาชนิดแก้ว โดยสรุป ควรใช้กระบอกฉีดยาชนิดแก้วต่อไป เพราะต้นทุนถูกกว่ากระบอกฉีดยาชนิดพลาสติกอย่างมาก

Abstract.

A comparative study of the true cost of recycled syringe and disposable syringe at Srinagarind hospital in 1987. The labour cost, present value of the capital cost and overhead cost of

the central supply service department were taken into account. The result presented that the usage rates of all recycled syringes were 698, 484 per year. The total cost of recycled syringe was 566, 632 bahts per year whereas that of disposable syringe was 1,808,850 bahts per year. There are two factors which might change the total cost of the recycled syringe such as the rates of broken-defective syringe and the labour cost. However the sensitivity analysis shows that the result is not sensitive to change by those factors. At the present time the use of recycled syringe is more economically than that of disposable syringe.

Recycled syringes (R.S) are mainly used in most of the hospitals in Thailand. Disposable syringes (D.S) now are being used in some hospitals and private clinics. The serility of the RS and usefulness of the D.S have been observed^(1,2). The cost of D.S might not be more expensive than R.S if the actual cost of the process was taken into account. To our knowledge there has been only one study on the cost comparison of both types of syringe⁽²⁾. However, many important cost items were omitted in that study. This study, therefore, was conducted for reanalyzing and comparing of the true costs of both types of syringe.

MATERIAL AND METHOD

The amount of R.Ss used in 1987 at Srinagarind hospital was recorded on monthly basis. The syringes that were broken or defective were also recorded. The duration of recycled process at the central supply service department (C.S.S.D) and duration of washing-transporting of the R.S were recorded for six months period. At the same period the special record for accidental needle stick, number of defective and broken syringes while washing the recycled needle were noted.

The direct costs of the R.Ss which included capital and material costs were calculated. These costs were washing ma-

chine, dryer, autoclave, area occupied by recycled process in C.S.D.D, market price of the syringe, paper and material for packing the recycle syringe. For the capital costs (machine and building) were calculated their present value in terms of equivalent annual cost⁽³⁾. The indirect costs (overhead costs) of C.S.S.D were also taken into account for the process of R.S. The labour cost for recycled process was calculated not only for their salaries but also for their employee benefit 60% of their salary, (calculating methods is available on request). The employee benefit was calculated from the costs of their houses which provided by the university, welfare and medical care costs which utilized by the employers. The working time of personnel was eight hours a day and twenty days a month or 1920 hours a year. The cost of D.S was calculated using the number of recycle syringe used in 1987 and the market price in same period.

RESULTS

The numbers of various kinds of the R.S and the rates of use per year basis were presented in Table 1. The prices of both types of syringe and packages of the R.S were shown in Table 2. The capital costs of recycled process was presented in Table 3. The time of recycled process was 2.20 ± 0.30 hours. The time of transporting the R.S from the wards to C.S.S.D and vice versa was 2.00 ± 0.35 hours. The labour costs of recycled process was presented in Table 4. The actual cost of R.S was 566, 632 bahts and that of the D.S was 1,808,850s baht (Table 5.)

The broken rates and number of defective syringes were major factors contributing to increase the cost of recycle syringe. The broken and defective rate of the syringes in this study was ten per cent. The result will be sensitive to change if the broken and defective R.Ss would be increased

upto six hundred per cent or the labour cost rises up to six times of the present cost.

DISCUSSION

The direct and indirect costs of C.S.S.D. were included in this study. The actual cost of C.S.S.D was determined by recording the quantity of services used by the C.S.S.D, multiplying the quantity by the unit prices of the service, and summing across all services. Because unit prices were fully allocated, they reflect not only the direct costs of care (e.g. salaries, wages, and supplies) but also an appropriate share of the costs of support departments (e.g. administration and house-keeping) and overhead items (e.g. employee benefits and equipment depreciation). The simultaneous-equation method was used to allocate all costs among support departments serving each other. The actual cost of C.S.S.D of Srinagarind hospital may not be similar to other hospitals. Generalization of these costs may be suitable for the university hospital or the big provincial hospital.

The cost of disposable syringe was substantially higher than the cost of recycled syringe, although all of the important cost items of the recycled syringe were included. The cost of recycled syringe was varied with the percentage of broken and defective syringes. Nevertheless, the disposable syringe is still more expensive in spite of the broken rates of recycle syringe were up to six hundred per cent. These broken rates are unlikely occurred in the real situation. Due to the limitation of resources in health care system, therefore, the use of recycle syringe is more economically than that of disposable syringe.

The process of recycle needle was susceptible to finger injury by needle stick and this might lead to infection with H.I.V. and hepatitis virus^(4,5). Despite of a low

incidence of needle stick, The risk of these infections and their costs of treatment are difficult to estimate and value. The disposable needle, therefore, may be reasonable to use instead of the recycled needle.

In summary the cost of disposable syringe was substantially higher than recycled syringe. The true cost of recycled syringe is three times cheaper than disposable one. The recycled syringe cost is 566,632 bahts per year and the disposable syringe cost is 1,808,850 bahts per year. The disposable syringe may be economical one if the broke rates of recycled syringe would be increased high up to 600% or the labour cost of recycled syringe increased up to six time of the present cost.

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Table 1 The number of various types of recycled syringe and usage rates per year in 1987

Types of the recycle syringe	Amount of the recycle syringe	Usage rates
1 ml.	599	35,612
1 ml.	1,335	171,360
5 ml.	1,598	216,502
10 ml.	1,365	192,670
20 ml.	623	53,854
50 ml.	319	15,851
Irrigation	208	12,635
all type	6,047	698,484

Table 2 The prices (baht) per year of recycle and disposable syringes, and packages of the recycle syringe in 1987.

Types of the syringe	Prices of recycle syringe		Prices of disposable syringe		Prices of package of recycled syringe
1 ml.	17,491	(29.20)	121,080	(3.40)	7,500
2 ml.	12,683	(9.50)	238,190	(1.39)	7,500
5 ml.	17,578	(11.00)	365,888	(1.69)	7,500
10 ml.	23,205	(17.00)	423,874	(2.20)	12,000
20 ml.	14,329	(23.00)	239,650	(4.45)	10,000
50 ml.	27,115	(85.00)	233,802	(14.75)	10,000
Irrigation	34,320	(165.00)	186,366	(14.75)	10,000
total	146,721		1,808,850		44,500

() the price per unit

Table 3 The capital costs in terms of equivalent annual cost and overhead costs of recycle process at C.S.S.D. (discount rate of 7%)

	Equivalent annual cost
Building & Overhead costs	71,681
Washings machine*	24,560
Drying machine*	6,423
Autoclave**	16,835
total	119,499

* Only used for recycle process.

** 10% of its workload used in recycle process.

Table 4 The labour costs of recycle process.

Two personnels work in C.S.S.D	cost/year
: salary (1970 baht/month)	23,640
: employee benefit (60% of salary)	14,184
total	37,824
: two working hours for recycle process (19.7*2*2*20*12)	18,912
One personnel works in each the impatient ward	
: two working hours for washing and transporting the recycle syringe	237,000
Total labour cost for recycle process	255,912

Working time means 8 hours/day or 20 days/month or 1920 days per year. The labour cost per hour is 19.7 baht (37,824/1920).

Table. 5 The total cost of recycle syringe (bahts) compared with the disposable syringe.

Type of costs	Recycle syringe	Disposable syringe
Capital costs	119,499	—
Labour costs	255,912	—
Cost of syringe	191,221	1,808,850
Grand total	566,632	1,808,850

Reference

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