ECONOMIC COST OF DENGUE HOSPITALISED EPISODE IN KHON-KAEN HOSPITAL, THAILAND

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Study Region: Geographical SE Asia

Burden of DHF on families in Jakarta*

- Average medical cost for a DHF grade II or III case was 43% of average monthly income.

- Average medical cost for an ICU admission in Jakarta was 188% of average monthly income.

DeRoeck et al., Policymakers views. Vaccine 2003:22:121-129.

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Burden of DHF on families in Cambodia*

- Average medical cost for simple dengue fever (not DHF) was around US$ 20

- This is the equivalent of a public sector physicians' monthly salary.

DeRoeck et al., Policymakers views. Vaccine 2003:22:121-129.

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BACKGROUND

Dengue is one of the major public health problems

- Thailand: in 2004
    - 63 cases per 100,000 and
    - a death rate of 0.08 cases per 100,000
- The economic burden of DHF on Thailand (based on 85 cases per 100,000)
    - Estimated US$ 31.48 million per year (in 1995 to 1997)

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OBJECTIVE

To estimate the economic cost of dengue hospitalized episode in one selected province: Khon-Kaen Provincial Hospital

Research methodology

- Design and setting: cost of dengue
  - prospective cost studies of dengue (DF, DHF, DSS) to hospitals and to patients cost plus their families
  - Semi-structured questionnaire: questions related to
    - direct patient costs (medical cost), such as expenditures for drugs, hospital fees, paramedical interventions plus+ transportation, food (non medical), etc.,
    - indirect patient costs resulting from income reductions due to the partial or complete inability to work of the caregivers and substitution of lost labour in family production.
  - Record forms for hospital cost were used to collect the labour, material and capital cost in each setting related to the dengue cases the cost centre approach.

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Costing frame: patients and their families

- Describes the burden on an affected family
  - Out of pocket medical costs.
  - Out of pocket associated costs (e.g. travel, food)
  - Lost income
  - Value of lost time

Direct & Indirect Cost

Direct

Medical

- Hospitalization
- Drugs
- Physician fees
- Lab test
- X-ray
- Etc.

Non medical

- food
- transportation
- lodging
- family care
- home aids
- clothing

Indirect

Morbidity

Mortality

- Absences from work
- Earning ability
- Long term disability
(value of income lost)

DATA COLLECTION

- 2004 - PMT recommended and PDVI approved and funded studies in 8 countries

- The study was approved by
  - The Ethical review board of
    - MOPH, Thailand
    - Khon-kaen hospital
    - IRB, PDVI

- 2005- Data collection started
  - 205 cases admitted in Khon-Kaen hospital with a provisional diagnosis of dengue infection

- 2006- Data are being cleaned and analysed with international workshops and report was submitted to PDVI – June 2007.

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DATA COLLECTION

- Subjects (or caretakers) interviewed once or twice about illness, treatment, and caretaker visits.

- Medical record extraction form

- Lab data collected from records or tests during the study.

- Information entered into customised Microsoft Access database.

- Data exported to Excel and SPSS, cleaned, aggregated by subject.

DATA ANALYSIS

- Key formula.

  Total cost of resources- *Quantity x unit cost.*

- Quantity and unit cost can be obtained from separate data sources.
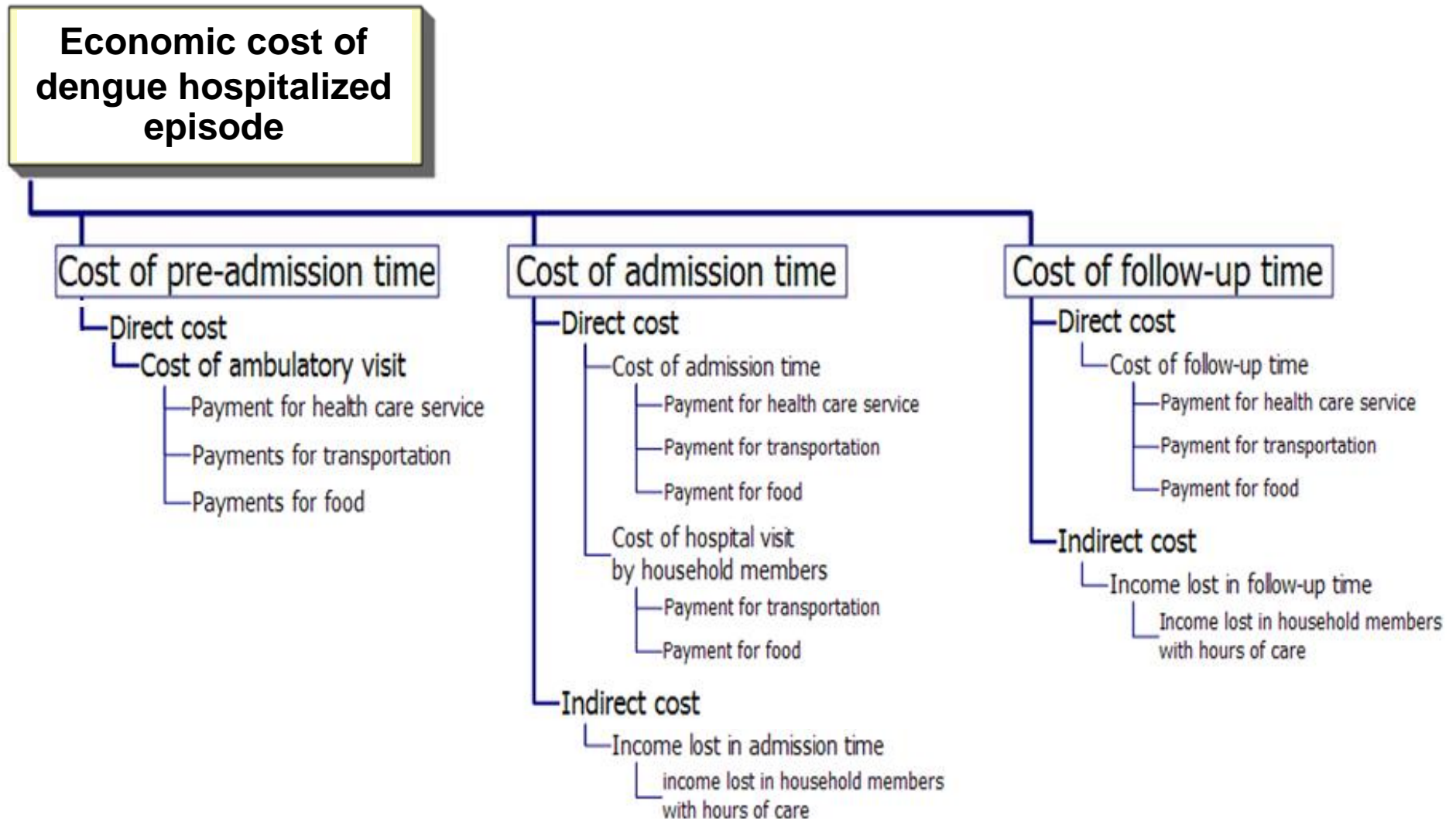
- Example 1: Hospital costs

  Hospitalisation cost- *length of stay x cost per day*

- Example 2: Lost time from self-employment or household activities

  Cost of lost time- *day lost x value per day*

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Framework: Economic cost of dengue hospitalized episode

Economic cost of dengue hospitalized episode

Cost of pre-admission time
- Direct cost
  - Cost of ambulatory visit
    - Payment for health care service
    - Payments for transportation
    - Payments for food

Cost of admission time
- Direct cost
  - Cost of admission time
    - Payment for health care service
    - Payment for transportation
    - Payment for food
  - Cost of hospital visit by household members
    - Payment for transportation
    - Payment for food
- Indirect cost
  - Income lost in admission time
    - income lost in household members with hours of care

Cost of follow-up time
- Direct cost
  - Cost of follow-up time
    - Payment for health care service
    - Payment for transportation
    - Payment for food
- Indirect cost
  - Income lost in follow-up time
    - Income lost in household members with hours of care

METHODS

- A study on cost occurred on provider perspective of dengue infection using
  - activity-based costing (ABC) approach
    - conducted among 112 dengue cases
    - 13 units such as:
      - Medical record Registration, Pharmacy
      - ER, OPD, Pediatric OPD, Laboratory, X-Ray
      - IPD, PICU
      - Physical Therapy, Social Medicine

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RESULTS

Patient characteristics

- At discharge, 173 (84%) of 205 cases were clinically diagnosed with dengue infection;
  - 72 were dengue fever (DF)
  - 47 were DHF
  - 54 were Dengue shock syndrome
  - About 55% were males with mean (sd) age of 9 (3) years (ranged 0 to 15 years).

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RESULTS

Length of stay (LOS)

- Average duration of illness episode about 11 days
- Overall, average LOS about 4 days
  - LOS longest among DSS
- About 6% admitted in Intensive Care Unit (ICU)
- During disease episode, mean school absenteeism was about one week
- None was dead

RESULTS

⅜ Household members and dependency ratio

○ The average size of household was 5 persons

○ Average number of household members (who had age less than 18 years) was 2.0

○ the dependency ratio was 2.4

RESULTS

Cost of dengue illness episode on households

○ Pre-admission period

- Total ambulatory visits to primary care units of the OPD or emergency room (ER) = 582 visits
  - 474 visits made to public sector
  - 108 visits made to private sector
- Mean of ambulatory visits were 3 times per case
- Mean of payment per visit were US$ 3.14

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RESULTS

○ Admission period

ſ both public and private in–patient providers during the
reference period were 297 times
(295 public sectors and 2 visits private sectors)

ſ mean payment per visit was 653.91 Baht (US$ 16.77)

ſ mean visit by householders per patient was about 6 visits and
mean of payment per visit was US$ 2.64

ſ from 309 household members (or 1.5 per patient)

○ 155 household members had days of work lost of 2.32
days per person

○ 132 members had income lost of US$ 6.56
per day per person

RESULTS

○ Follow-up period

   ĺ ambulatory visits were 43 visits

      ○ 41 visits made to public sector

      ○ 2 visits made to private sector

   ĺ average payment per visit was US$ 5.95

RESULTS

Total cost of dengue illness episode on household by period of illness

	Medical care cost	Non-medical care cost	Income lost	Total
Cost of Pre admission time				**8.91**
Direct cost (Ambulatory)	1.93	6.98	0	
Cost of Admission time				**56.08**
Direct cost	2.0	35.27	0	
Indirect cost	0	0	18.81	
Cost of Follow-up time				**8.42**
Direct cost	2.33	5.20	0	
Indirect cost	0	0	0.89	
Total	**6.26**	**47.45**	**19.70**	**73.41**

RESULTS

Cost per hospitalized case, US$

Service	Average per case	Units	Unit cost	Total cost
Ambulatory				
• Before admission	2.84	visits	0.68	2.04
• After discharge	0.21	visits	1.84	0.39
Inpatient	4.42	days	64.88	286.76
Grand total	N/A	N/A	N/A	289.19

RESULTS

Medical care cost of Dengue

✂ From ABC: average cost per case in DF, DHF and DSS was US$ 209.34, US$ 193.42 and US$ 485.12, respectively (p<0.001)

CONCLUSIONS

- The finding from the study confirms that dengue infection is an acute illness that the episode will not last longer than two weeks in average

- so the study on costing will reflect or represent cost of acute illness

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CONCLUSIONS

- Due to such nonspecific symptoms before admission, dengue disease could not be recognised at a very early stage

- Patients with DSS not only had longest length of stay but they also had the highest resource consumption including time, materials and labour using ABC

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Acknowledgement

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Thank you for your attention

I) Hospitalized Patients:

- **Method:** we reviewed logs of wards to identify patients with diagnosis of dengue infection or viral fever

- We collected information available on those logs and further identified medical records of patients with those diagnoses

- We focused on pediatric wards

Medical Records: Extraction

- Age, gender, weight, postal code
- <u>Diagnosis admission and discharge</u>
- <u>Date admission and discharge</u>
- Phases of care: intake, general ward, ICU
- Fever onset, platelets count, haematocrit (highest, lowest, IV), plasma leak, perfusion
- Number and type of lab tests, X-Rays, other tests
- IV fluid therapy, days, and volume
- Drugs type, frequency and doses

Virology Log: Extraction

- If serology was performed
- Number of times
- Positive Results
- Virus Isolation