Cost-benefit analysis of community based rehabilitation program using willingness to pay measured by the contingent valuation method

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The health technology studied was a community-based rehabilitation programme for a range of clinical conditions.

Type of intervention
Rehabilitation.

Economic study type
Cost-benefit analysis.

Study population
The study population consisted of participants in the rehabilitation programme, which was carried out in 18 wards of Yokohama City (Japan), during the study period.

Setting
The setting was the community. The economic study was conducted in Yokohama city, Japan.

Dates to which data relate
The effectiveness evidence was obtained from a questionnaire survey that was carried out in 2000. The resource data and cost data relate to 1999. The price year was not stated but it is likely to have been 1999.

Source of effectiveness data
The effectiveness data were derived from a single study, which used a questionnaire survey.

Link between effectiveness and cost data
The costing was carried out retrospectively on a different patient sample from that used in the effectiveness analysis. The costing was based on the actual costs for the rehabilitation programme in the previous year.

Study sample
No power calculations were carried out to determine the sample size. Of the 631 participants in the rehabilitation programme who were given questionnaires, 501 responded to the survey and 463 replied to the question concerning WTP. Among the respondents, 59.5% were male and 40.5% were female. The majority (80.4%) were suffering from the after effects of brain vessel diseases. The sample comprised three age groups, aged less than 60 years (22.5%), between 60 and 69 years (49.3%), and 70 years or more (28.1%). Some of the participants (10.9%) lived alone. The participants had attended the programme for varying lengths of time: 29.3% less than a year, 29.1% between 1 and 2 years, 20.8% between 3 and 5 years, 15.3% between 6 and 10 years, and 5.5% between 11 and 16 years. The majority
of the sample (78.9%) had attended the programme once or twice a month, although 4.2% had attended more than 5 times per month. In addition to the programme, most of the participants had had rehabilitation in other settings such as at home or hospitals.

**Study design**
This was a multi-centred cohort study using a questionnaire survey. The response rate for WTP was 73.4%. The follow-up was conducted only to the point of return of the survey questionnaires.

**Analysis of effectiveness**
The analysis used treatment completers only. The outcome assessed was the effectiveness of the programme, as perceived by the participants. It was regarded as one of the influencing factors in determining the WTP of the participants. The authors, therefore, carried out a correlation analysis between the perceived effectiveness and WTP, together with other possible influencing factors of the WTP results. These were summarised and reported in other fields in this abstract ('Measure of Benefits Used In The Economic Analysis' and 'Effectiveness Results').

**Effectiveness results**
Overall, 50.5% of the participants reported that their health condition had improved due to the rehabilitation programme, while 48.4% did not see any improvements and 1.1% thought their health condition had worsened.

The perceived effectiveness of the programme was found to be unrelated to WTP. The only factors that were related to WTP were personal factors such as the duration of functional disability (Pearson correlation coefficient, $r = -0.114$, $p<0.05$) and annual income ($r = 0.124$, $p<0.01$).

**Clinical conclusions**
While approximately half of the participants thought the programme was effective, the subjective effectiveness used in the survey did not reflect the WTP of the patients.

**Measure of benefits used in the economic analysis**
In accordance with the cost-benefit approach adopted by the authors, the WTP of the participants was used as the principal benefit measure. The quality of life was also assessed through the MOS Short Form 36-Item Health Survey (SF-36), which was included in the questionnaire, with each item of the SF-36 being correlated with the WTP results.

**Direct costs**
The direct costs were derived from the actual costs incurred for rehabilitation programmes in Yokohama City for the previous year. These included regular (municipal employees such as nurses and caseworkers) and irregular (external healthcare professionals such as doctors and therapists) personnel and volunteers. The costs for these personnel included wages, travel expenses, facility fees, stationary and material costs, printing costs, emergency medication costs, transport costs, and costs for other necessary equipment (for example, musical instruments, sports equipment and wheel chairs). Discounting was not applied. The price year appears to have been 1999.

**Statistical analysis of costs**
No statistical analysis of the costs was conducted.

**Indirect Costs**
The indirect costs were not included.
Currency
Japanese yen (Y).

Sensitivity analysis
The cost range was based on the costs for the previous year. Two types of cost were examined. The first (cost 1) was personnel and other costs, whereas the second (cost 2) was cost 1 plus volunteer personnel costs. The type of sensitivity analysis conducted was that of extremes (minimum and maximum values based on the lowest and highest costs from the wards that participated in the programme). Ranges were thus appropriately derived from the actual data used in the study.

Estimated benefits used in the economic analysis
The median WTP value was Y300 and the mean was Y441. The 95% confidence interval ranged from Y800 to Y1,682.

All the items in the SF-36 were found to be unrelated to the WTP, (non significant). These included physical functionality, everyday life role function (physical and mental), physical pain, general health, energy level, social function, and mental health).

The correlation analyses relating to WTP and other factors were reported in the effectiveness results.

Cost results
Cost 1 ranged from Y2,079 to Y6,732, while cost 2 ranged from Y3,289 to Y8,366.

Synthesis of costs and benefits
Compared with the range of the costs and benefits reported in the previous sections, the WTP was found to be much lower, resulting in a net cost for the programme. The sensitivity analyses revealed that this was true for the range of costs tested.

Authors' conclusions
The results indicated a net cost for the programme. The authors indicated, however, that the lower willingness to pay (WTP) values might reflect the study sample, which was made up predominantly of lower income participants. The cost-benefit analysis of a community-based rehabilitation programme has to be carried out more precisely by improving two aspects. First, the saved costs of medical care and long-term care and the benefits to others, such as volunteers and community residents, have to be examined. Second, WTP has to be re-assessed so that various aspects of effectiveness (health-related and non health-related) should be taken into consideration.

CRD COMMENTARY - Selection of comparators
Due to the use of a cost-benefit analysis, the comparator was clear. The comparator was based on an analysis of the actual costs of the programme, compared with the sample's willingness to pay for it.

Validity of estimate of measure of effectiveness
The effectiveness data (satisfaction with the programme) were derived from a questionnaire, which was appropriate for the approach adopted by the authors. However, the response rate (73.4%), although high for this type of survey, may have resulted in some bias. The authors provided an outline and rationale for their choice in that they pointed out the limitations of face-to-face interviews (interviewer influence among other well established factors). However, the authors acknowledged that the latter might have been a preferred option in terms of increased validity in the effectiveness results.
Validity of estimate of measure of benefit
The benefit measure of WTP was appropriate for the approach used, i.e. a cost-benefit analysis. Within the limitations of response rate and potential bias, it should have produced reliable results. The authors also used what appears to have been a suitable version of the SF-36 to measure aspects of quality of life, although in fact no significant results were found. The sample, however, was associated with a good deal of heterogeneity, and this may partly explain these results.

Validity of estimate of costs
The costing undertaken would appear to have been appropriate to the study perspective, as all of the relevant resources and sources for unit prices were included. The costing was also broken down into two informative cases. The more extensive of these analyses took the costs for volunteer workers and travel into account, thus extending the analysis into the social perspective. Sensitivity analyses were also appropriately conducted using two extreme values from the sample of wards that were included in the study. The WTP approach is also a valid approach for assessing the benefits in monetary terms. Therefore, the overall validity of the cost and benefit analysis should have a high validity. Some details, such as the chosen price year, were not explicitly stated. Also, the generalisability of the results to settings outside Japan was unclear. However, the authors offered an explanation of their result (a net cost for the programme) by way of discussion, and the factors that may influence this. This would be useful to decision-makers outside of Japan.

Other issues
The authors did not compare their results with those from other studies. They did, however, discuss the methodological issues surrounding WTP with reference to other papers on this topic. The issue of generalisability was not formally addressed, although the authors did include suitable sensitivity analyses applicable to Japanese rehabilitation programmes. Therefore, there is good external validity within Japan. The authors argued for establishing a stronger link between the effectiveness of the rehabilitation programme and the WTP results, as well as the factors affecting quality of life such as increased independence, activity capacity, acceptance of disability, human relations and secondary prevention of their condition.

Implications of the study
The authors argue that a cost-benefit analysis of community-based rehabilitation programmes has to be carried out more precisely by improving two aspects. First, the saved costs of medical care and long-term care and the benefits to others, such as volunteers and community residents, have to be examined. Second, WTP has to be re-assessed so that various aspects of effectiveness (health-related and non health-related) should be taken into consideration.

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