

Cost-Utility Analysis of CTEV Treatment by Ponseti Method in Siaga Utama Orthopedic Hospital

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ABSTRACT

Congenital talipes equinovarus (CTEV), or true clubfoot, is a foot deformity. The incidence of CTEV varies depending on race and gender. Traditionally, surgical intervention has been the treatment of choice for CTEV at a considerable cost. The Ponseti is a CTEV treatment method that does not use surgery and anesthesia. Instead, it uses gentle manipulation to correct the deformity. It is also more affordable than surgical treatment. Therefore, this study aims to explain the Effect of CTEV Treatment Costs with the Ponseti Method on Patient Quality of Life at Siaga Utama Orthopedic Hospital. This study uses quantitative methods. This study used a retrospective study with a sample of CTEV patients at Siaga Utama Orthopedic Hospital from February 2022 - February 2023. The author examined the effect of CTEV treatment costs on quality of life (QALYs). The results showed that the cost of treatment with the onset method positively impacted the patient's quality of life. The cost of treatment with the Ponseti method proved to be cheaper. However, it can vary depending on many factors, such as location, type of disease or condition, the severity of the situation, and so on. In addition, the Ponseti method is time-consuming and requires specialized skills from the therapist to achieve optimal results.

Keywords: Cost of Treatment; CTEV; Ponseti method; Quality of Life; Patients;

ABSTRAK

Congenital talipes equinovarus (CTEV), atau kaki pengkor sejati, adalah kelainan bentuk kaki. Insiden CTEV bervariasi, tergantung pada ras dan jenis kelamin. Secara tradisional, intervensi bedah telah menjadi pengobatan pilihan untuk CTEV dengan biaya yang cukup besar. Ponseti adalah metode pengobatan CTEV yang tidak menggunakan pembedahan

dan anestesi. Sebaliknya, metode ini menggunakan manipulasi lembut untuk memperbaiki kelainan bentuk. Metode ini juga lebih terjangkau dibandingkan dengan perawatan bedah. Oleh karena itu, penelitian ini bertujuan untuk menjelaskan Pengaruh Biaya Pengobatan CTEV dengan Metode Ponseti terhadap Kualitas Hidup Pasien di Rumah Sakit Ortopedi Siaga Utama. Penelitian ini menggunakan metode kuantitatif. Penelitian ini menggunakan studi retrospektif dengan sampel pasien CTEV di Rumah Sakit Ortopedi Siaga Utama pada periode Februari 2022 - Februari 2023. Penulis meneliti pengaruh biaya pengobatan CTEV terhadap kualitas hidup (QALYs). Hasil penelitian menunjukkan bahwa biaya pengobatan dengan metode Ponseti berdampak positif terhadap kualitas hidup pasien. Biaya pengobatan dengan metode ini terbukti lebih murah. Namun, hal ini dapat bervariasi tergantung pada banyak faktor, seperti lokasi, jenis penyakit atau kondisi, tingkat keparahan situasi, dan sebagainya. Selain itu, metode Ponseti memakan waktu dan membutuhkan keterampilan khusus dari terapis untuk mencapai hasil yang optimal.

Kata kunci: Biaya Pengobatan; CTEV; Metode Ponseti; Kualitas Hidup; Pasien;

INTRODUCTION

Congenital talipes equinovarus (CTEV), or true clubfoot, is a foot deformity (Murphy et al., 2021; Mustari et al., 2022). The incidence of CTEV varies, depending on race and gender. The incidence of CTEV is reported to be around 1 to 2 per 1000 births, with a bilateral incidence of 50% of cases, with varying incidences in several countries, such as in the United States, the incidence of clubfoot is 2.29 per 1000 live births, in Caucasia 1.6 per 1000, in China and Japan 0.5 per 1000, in Maori and other Pacific islands 6-7 per 1000, in Polynesia 6.81 per 1000, in the UK the prevalence according to national surveys is 0.89 per 1000 live births. However, 1,242 or greater have been reported (Smythe et al., 2017). The prevalence of clubfoot in Indonesia is between 0.76 - 3.49 per 1000 live births, 4.8 million babies per year, and 3,648 to 16,752 new cases of clubfoot in Indonesia per year (Purnomo et al., 2019).

Many cases of CTEV in lower-middle class and low-education countries need to be handled and addressed due to limited funds (Agarwal et al., 2014; Dragoni et al., 2016). So far, surgical intervention is an option for treating CTEV 2 at a considerable cost. Therefore, another method is needed to treat CTEV at a lower price and high success rate. The Ponseti is a CTEV treatment method that does not use surgical intervention or anesthesia. Instead, use gentle manipulation to correct the deformity. The costs incurred are also more affordable than surgical treatment (Malhotra et al., 2018; Mustari et al., 2022).

In Indonesia, there is no data on the disease burden due to CTEV that must be borne by the government based on Disability Adjusted Life Years (DALYs) according to WHO standards. With DALYs, the disease burden that occurs in the community of a region can be compared with one another, also on a world scale (between countries/regions/subregions) (Dave et al., 2020; Rochmah et al., 2020; Shirley et al., 2016).

Then, some previous studies are relevant to this research. Research from (Grimes et al., 2016) explains the cost-effectiveness of clubfoot treatment using the poinsettia method in low and middle-income countries. The findings of this study demonstrate that the Ponseti method for treating club foot is cost-effective and practical in a low-income country setting. These findings align with research from (Hussain et al., 2014) which explains the cost-effectiveness of clubfoot with onset in Pakistan. While a study from (Ducic et al., 2021; Shabtai et al., 2014) evaluates minimally invasive methods in treating congenital clubfoot. The findings of his research demonstrate that The Ponseti treatment method, if used on time, fulfills all the requirements that are expected from a contemporary medical procedure: simplicity in performance, minimally invasive, wide availability, cost-effectiveness, and successful treatment results.

Based on the above background, it is necessary to analyze the calculation of the costs required for CTEV treatment using the Ponseti method with the patient's quality of life (QALY). This is the novelty offered by this research. Therefore, this study aims to explain the Effect of CTEV Treatment Costs with the Ponseti Method on Patient Quality of Life at Siaga Utama Orthopedic Hospital.

METHOD

This study uses a quantitative method(Lerche, 2012) with a retrospective study approach(Talari & Goyal, 2020). The variables used are the Ponseti unit cost method and QALYs. Unit cost calculates direct and indirect costs, while QALY measures the satisfaction/quality of life of CTEV patients using a questionnaire form. The population in this study were CTEV patients receiving treatment at Siaga Utama Orthopedic Hospital. The sampling technique in this study was purposive sampling. The considerations in taking this sample were CTEV patients who received treatment with the Ponseti method at Siaga Utama Orthopedic Hospital in February 2022 – February 2023, so 27 respondents were obtained as samples for analysis in this study. We estimated the average cost-utility analysis of CTEV treatment with the average number of QALYs.

RESULTS AND DISCUSSION

Demographic Profile of Respondents

Based on secondary data from the patient report at Poliklinik of Siaga Utama Orthopedic Hospital, we can have descriptions of the respondent.

Table 1.
Age of Respondent.

Age of respondent	Amount
< 1 month	18
1-3 months	5
6 months - 1 year	4
Total	27

Table 2.
Gender of Respondent.

Gender of respondent	Amount
Male	13
Female	14
Total	27

Table 3.
Types of CTEV.

Type of CTEV Respondent	Amount
Lateral Right	12
Lateran Left	5
Bilateral	10
Total	27

Table 4.
Repetition of Respondent's Cast.

Repetition of Respondent's Cast	Amount
2x cast	1
3x cast	11
4x cast	13
5x cast	1
6x cast	1
Total	27

Table 5.
Total Cost of CTEV Treatment.

Total Cost of CTEV Treatment	Amount
Rp 6.450.750	1
Rp 3.388.750	11
Rp 2.830.750	4
Rp 4.260.750	7
Rp 1.272.000	1
Rp 6.550.750	1
Rp 5.332.750	2
Total	27

Based on this study, the average cost of the Ponseti treatment is US\$ 255 per patient or IDR 3.828.377. The *Life Year* from the Central Bureau of Statistics in Indonesia is 74,62. The average number of QALYs averted was 55,2 yielding a cost-utility analysis is US\$ 4,6 per QALYs or IDR 68.406.

Instrument Validity and Reability Test

Satisfaction or quality of life obtained from a health intervention is obtained through the EQ-5D-5L questionnaire, which is a questionnaire used to measure a person's quality of life at a certain point in time. This questionnaire has five dimensions: mobility, self-care, daily activities, pain or discomfort, and anxiety or depression. Each size has five response levels: no problem, little problem, moderate problem, severe, and very severe (Long et al., 2021; Purba et al., 2018).

The EQ-5D-5L questionnaire is frequently used in health research to evaluate the effectiveness of health interventions or treatments. By measuring changes in a person's quality of life before and after an intervention, researchers can determine the effectiveness of the intervention. The results of the EQ-5D-5L questionnaire can be used to calculate a quality of life score called "utility score." This score can be used to compare the quality of life between different groups or to measure changes in quality of life over time. In the context of health interventions, the quality of life score obtained from the EQ-5D-5L questionnaire can be used as an indicator of the success of the

intervention. The higher the quality of life score, the greater the patient's satisfaction with the intervention (Kouwenberg et al., 2019; Sinclair et al., 2020; Sum et al., 2021).

Table 6.
Questionnaire Results.

Patient Conditions	N	F	P value
WALKING ABILITY			
I have no difficulty in walking	19	70%	*0,000
I have a little difficulty in walking	5	18%	
I have some difficulty in walking	3	12%	
I have great difficulty in walking	0	0%	
I can't walk	0	0%	
SELF-CARE			
I have no trouble bathing or dressing myself	22	82%	*0,001
I have little difficulty bathing or dressing myself	3	10%	
I have some difficulty bathing or dressing myself	2	8%	
I have great difficulty bathing or dressing myself	0	0%	
I cannot bathe or dress myself	0	0%	
USUAL ACTIVITIES			
I have no difficulty in doing the activities that I usually do	17	64%	0,027*
I have little difficulty in doing the activities that I usually do	6	22%	
I have some difficulty in doing the activities that I usually do.	4	14%	
I have great difficulty in doing my usual activities	0	0%	
I cannot do the activities that I usually do	0	0%	
PAIN / DISCOMFORT			
I have no pain/ discomfort	20	72%	*0,081
I feel a little pain/ discomfort	7	24%	
I feel quite painful/uncomfortable	2	4%	
I feel very painful / uncomfortable	0	0%	
I feel extreme pain / discomfort	0	0%	
ANXIETY/DEPRESSION (SADNESS)			
I don't feel anxious/depressed (sad)	23	86%	*0,211
I feel a little anxious/depressed (sad)	3	10%	
I feel quite anxious/depressed (sad)	2	4%	
I feel very anxious/depressed (sad)	0	0%	
I feel extremely anxious/depressed (sad)	0	0%	

Source: Primary Data is Processed, 2023

Based on the results of the questionnaire in Table 6, the utility value can be calculated based on the value set and VAS (Visual Analog Scale) in the patient.

Table 7.
Data on Respondents' Utility and VAS Values.

<i>Value set</i>	<i>Category</i>	<i>VAS</i>	<i>Category</i>
0,84	Excellent	76,2	Excellent

Table 7 is the average utility value in terms of VAS and Value Set resulting from CTEV patient respondents. The result is that patients have a very good quality of life.

Funding, Medical Expenses and Cost utility analysis

The actual cost of a health intervention in economic terms does not refer only to the nominal amount of expenditure but to the value of all factors in patient care. First, direct or direct medical costs are classified as follows. These costs are directly paid for health services, including staff, capital, and drug acquisition costs. Total direct costs are the sum of registration fees, consultation fees, laboratory fees, drug costs, and x-ray costs (Weatherly et al., 2009).

Second, direct non-medical or direct non-medical costs are costs tied to treatment but are not medical in nature. For example, the cost of traveling to and from the doctor or hospital. Care for the patient's family, meals, and lodging for patients and families during treatment (Owen et al., 2012). Third, Indirect costs are costs experienced by the patient or the patient's family—for example, loss of income and productivity (Wright et al., 2015). Fourth, Intangible costs are costs that cannot be felt, such as pain, worry, or difficulty for patients and families (Viswanathan et al., 2010).

Table 8.
Cost of Treatment of CTEV Patients with the Ponseti method.

No.	Type of BHP	Amount	Price@
1	Gipsona 3 inch	1 piece	Rp 58.000
2	Softban 4 inch	1 piece	Rp 56.000
3	Pehacain	1 piece	Rp 6.000
4	Spuit 1 cc	1 piece	Rp 1.200
5	Bisturi Uk. 11	1 piece	Rp 7.600
6	Benang T-Silk 3.0	1 piece	Rp 123.000
7	Iodine	50 ml	Rp 119/ml
8	Hansaplast Kecil	1 piece	Rp 1.000

Table 9.
CTEV Patient Cost Utility Analysis of Surgical and Ponseti Methods.

No.	Types of Medical Examinations & Actions	price	N=27
1	Check Week 1 and Place Gip	Rp 400.000	

2	Check Week 2, remove Gip, install Gip	Rp 500.000
3	Check Week 3, remove gip, apply gip	Rp 500.000
4	Check Week 4, remove gip, local surgery tenotomy (percutaneous Achilles tenotomy), apply gip	Rp 1.200.000
5	Check Week 5	Rp 100.000
6	Check Week 6, remove gip	Rp 200.000
Total		Rp 2.900.000
Unit Cost Per Month		Rp 107.407
Unit Cost Per years		Rp 1.288.884

Source: Primary Data is Processed, 2023

The costs calculated in this study are direct costs related to health services provided to CTEV patients, especially the costs of examinations, medical procedures and BHP. Table 9 shows the calculation of the unit cost per month for CTEV patients. It is known that IDR 107,407 per person is more efficient using the Ponseti method.

Table 10.
Cost Utility Analysis of CTEV Patients with the Ponseti Method

Medical Expenses per Year (Rp)	Life Year (Year)	Utility	QALYs
IDR 3.828.377	74,62	0,75	55,2
Calculations		Total	
AUB = 3.828.377/55,2		Rp 68.406 for quality of life years (QALYs)	

Table 10 shows the calculation of CTEV patients using the Ponseti method. The Analysis of Cost Utility (AUB) obtained by CTEV patients using the Ponseti method is IDR 68,406 for the age increase of quality of life years (QALYs). This result shows that the cost of improving the quality of life of CTEV patients in one year of life is relatively small and light using the Ponseti method.

Kruskal-Wallis test is one of the non-parametric statistical analysis methods used to compare three or more independent groups that differ in one non-parametric variable (Guo et al., 2013; Hecke, 2012). In this case, the non-parametric variable is the quality of life of CTEV patients with the ponseti method measured using the EQ-5D-5L questionnaire (table 11, 12).

Table 11.
Normality Test Results

Variabel		Shapiro wilk		
		Statistic	Sig	Description
Total Handling Cost	Unilateral Left	0,881	0,314	Normal

Unilateral Right	0,699	0,001	Not normal
Bilateral	0,650	0,000	Not normal

Table 12.

Comparison Test Results (Kruskal-Wallis Test)

Total Handling Cost	N	Mean	p value
Unilateral Left	27	6,00	0,000
Unilateral Right		10,25	
Bilateral		22,50	

Based on the results of the Kruskal-Wallis test, it was found that there were significant differences in 4 domains of CTEV patients' quality of life, namely walking ability, self-care, usual activities, and pain. This shows that the panseti method affects the quality of life of CTEV patients in these 4 domains in a statistically significant manner.

DISCUSSION

Cost-utility analysis is a form of economic evaluation whose outcomes are expressed in terms of the quality of life gained by the patient and the quality of use (Parkin & Devlin, 2006; Scope et al., 2022). The information provided by cost-utility analysis can be beneficial for making choices between different treatments for a disease or disorder. Still, this tool needs to be improved in its ability to help give options between programs or treatments for other illnesses. The results of the cost-utility analysis can be depicted in a cost-utility ratio. This ratio is the cost per Quality-Adjusted Life Year (QALY) the patient gains. The treatment alternative with the lowest cost per QALY is the right choice (Griebsch et al., 2005).

The benefit and cost relationship of the Ponseti method is calculated based on direct costs, life expectancy, and utility. Table 10 shows the calculation of CTEV patients using the Ponseti method. The cost-utility analysis (AUB) obtained by CTEV patients using the Ponseti method is IDR 68,406 for quality-of-life years (QALYs). This result shows that the cost of improving the quality of life of CTEV patients in one year of life is relatively small and light using the Ponseti method.

Furthermore, this study found significant differences in 4 domains of CTEV patients' quality of life: walking ability, self-care, usual activities, and pain. This shows that the Panseti method affects the quality of life of CTEV patients in these four domains statistically significantly. However, keep in mind that the Kruskal-Wallis test only provides information about significant differences between groups compared to one non-parametric variable (Guo et al., 2013). These results cannot be used to identify the factors causing the differences or to determine cause-and-effect relationships. Therefore, it is necessary to conduct further research using other analytical methods to obtain more detailed and complete information about the quality of life of CTEV patients.

Based on the information provided, the majority of respondents with a diagnosis of CTEV did not find it difficult to perform daily activities such as walking, self-care, and usual activities. Although most respondents felt a little pain or discomfort with the disease, it did not affect their ability to carry out daily activities. This shows that respondents diagnosed with CTEV have a good quality of life after being given treatment. This is supported by data obtained from the Value Set and VAS scores, which can be used to measure the patient's quality of life. The statement that pancetta treatment costs

less compared to surgical methods may be accurate, but remember that it can vary depending on many factors such as location, type of disease or condition, the severity of the situation, and so on.

The poinsettia method is a conservative technique used to treat congenital talipes equinovarus (CTEV) or clubfoot in infants. This method uses manipulation and flattening of the foot position with bandages and casts (Adegbehingbe et al., 2017; Agarwal et al., 2014). The cost of treatment with this method can vary depending on the duration of treatment, the type of treatment given, and the severity of the clubfoot. However, remember that the Ponseti method takes quite a long time and requires special skills from the therapist to obtain optimal results. Meanwhile, surgical procedures for treating clubfoot can also vary depending on the type of surgery performed, the severity of the clubfoot, the health facility used, and so on. However, surgical methods can be more expensive than conservative methods such as the Pancetta method (Dragoni et al., 2016; Miller et al., 2016).

However, the cost of treatment is one of many factors to consider in choosing a treatment method. Other factors such as treatment effectiveness, risks and complications, and availability of health facilities also need to be considered to select the most appropriate treatment method for the patient. The results of this study indicate changes and improvements in the quality of life in CTEV patients using the Ponseti method. The resulting cost-utility analysis obtained a mark of Rp 68,406 for the increase in the quality of life years (QALYs) of CTEV patients. Respondents (CTEV patients) only need to pay the amount mentioned above to get a better rate of life increase.

CONCLUSIONS AND SUGGESTIONS

Based on the study's results, several conclusions can be drawn in this study, including; There are changes and improvements in the quality of life of CTEV patients using the Ponseti method. Then, the resulting cost-utility analysis obtained a result of Rp 68,406 for additional quality-of-life years (QALYs) of CTEV patients. Furthermore, respondents (CTEV patients) only need to pay the amount mentioned above to get a better quality of life increase. Finally, there is an influence between the analysis of cost per unit of CTEV treatment using the Ponseti method on QALYs.

More than that, this study has implications, namely first, for health workers, especially village midwives and health centers, who are expected to increase further health promotion activities related to handling babies born with clubfoot / CTEV. This is because CTEV treatment carried out as early as possible dramatically affects the patient's quality of life, and the costs incurred are affordable with the use of non-surgical methods, namely the Ponseti Method.

Secondly, for the community, the results of this study are expected to increase the understanding of parents who have children with CTEV about CTEV treatment using the poinsettia method and later can choose or not be afraid to undergo treatment for their sons and daughters, both in terms of medical actions taken because it has been proven safe and effective and in economic terms because the cost of treatment is quite affordable.

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Conflict of Interest Statement

The authors declare no conflict of interest.

REFERENCES

Adegbehingbe, O. O., Adetiloye, A. J., Adewole, L., Ajodo, D. U., Bello, N., Esan, O., Hoover, A.

- C., Ior, J., Lasebikan, O., Ojo, O., Olasinde, A., Songden, D., & Morcuende, J. A. (2017). Ponseti method treatment of neglected idiopathic clubfoot: Preliminary results of a multi-center study in Nigeria. *World Journal of Orthopedics*, 8(8), 624–630. <https://doi.org/10.5312/wjo.v8.i8.624>
- Agarwal, A., Shaharyar, A., & Kumar, A. (2014). Clubfoot Associated With Congenital Constriction Band: The Ponseti Method Perspective. *Foot & Ankle Specialist*, 8(3), 230–233. <https://doi.org/10.1177/1938640014565049>
- Dave, M., Rankin, J., Pearce, M., & Foster, H. E. (2020). Global prevalence estimates of three chronic musculoskeletal conditions: club foot, juvenile idiopathic arthritis and juvenile systemic lupus erythematosus. *Pediatric Rheumatology*, 18(1), 49. <https://doi.org/10.1186/s12969-020-00443-8>
- Dragoni, M., Farsetti, P., Vena, G., Bellini, D., Maglione, P., & Ippolito, E. (2016). Ponseti treatment of rigid residual deformity in congenital clubfoot after walking age. *The Journal of Bone and Joint Surgery*, 98(20), 1706–1712. [https://doi.org/98\(20\):p 1706-1712](https://doi.org/98(20):p%201706-1712), October 19, 2016.
- Ducic, S., Lazovic, M., Radlovic, V., & Bukva, B. (2021). The ponseti method followed by minimally invasive surgery as method of choice in treatment of congenital talipes equinovarus: Review article. *Central European Journal of Paediatrics*, 17(1), 18–26. <https://doi.org/10.5457/p2005-114.283>
- Griebsch, I., Coast, J., & Brown, J. (2005). Quality-adjusted life-years lack quality in pediatric care: a critical review of published cost-utility studies in child health. *Pediatrics*, 115(5), e600–e614. <https://doi.org/https://doi.org/10.1542/peds.2004-2127>
- Grimes, C. E., Holmer, H., Maraka, J., Ayana, B., Hansen, L., & Lavy, C. B. D. (2016). Cost-effectiveness of club-foot treatment in low-income and middle-income countries by the Ponseti method. *BMJ Global Health*, 1(1). <https://doi.org/10.1136/bmjgh-2015-000023>
- Guo, S., Zhong, S., & Zhang, A. (2013). Privacy-preserving Kruskal–Wallis test. *Computer Methods and Programs in Biomedicine*, 112(1), 135–145. <https://doi.org/https://doi.org/10.1016/j.cmpb.2013.05.023>
- Hecke, T. Van. (2012). Power study of anova versus Kruskal-Wallis test. *Journal of Statistics and Management Systems*, 15(2–3), 241–247. <https://doi.org/10.1080/09720510.2012.10701623>
- Hussain, H., Burfat, A. M., Samad, L., Jawed, F., Chinoy, M. A., & Khan, M. A. (2014). Cost-effectiveness of the Ponseti method for treatment of clubfoot in Pakistan. *World Journal of Surgery*, 38(9), 2217–2222. <https://doi.org/10.1007/s00268-014-2530-2>
- Kouwenberg, C. A. E., Kranenburg, L. W., Visser, M. S., Busschbach, J. J., & Mureau, M. A. M. (2019). “The validity of the EQ-5D-5L in measuring quality of life benefits of breast reconstruction.” *Journal of Plastic, Reconstructive & Aesthetic Surgery*, 72(1), 52–61. <https://doi.org/https://doi.org/10.1016/j.bjps.2018.08.023>
- Lerche, L. (2012). *Quantitative Methods*. Elsevier.
- Long, D., Polinder, S., Bonsel, G. J., & Haagsma, J. A. (2021). Test–retest reliability of the EQ-5D-5L and the reworded QOLIBRI-OS in the general population of Italy, the Netherlands, and the United Kingdom. *Quality of Life Research*, 30(10), 2961–2971. <https://doi.org/10.1007/s11136-021-02893-3>
- Malhotra, R., Mohapatra, A., Arora, G., Choudhury, P., Joshi, H., & Patel, P. (2018). Ponseti technique for the management of congenital talipes equinovarus in a rural set-up in india: Experience of 356 patients. *Children*, 5(4). <https://doi.org/10.3390/children5040049>
- Miller, N. H., Carry, P. M., Mark, B. J., Engelman, G. H., Georgopoulos, G., Graham, S., & Dobbs, M. B. (2016). Does strict adherence to the Ponseti method improve isolated clubfoot treatment outcomes? A two-institution review. *Clinical Orthopaedics and Related Research*®, 474, 237–243. <https://doi.org/https://doi.org/10.1007/s11999-015-4559-4>
- Murphy, D., Raza, M., Khan, H., Eastwood, D. M., & Gelfer, Y. (2021). What is the optimal treatment for equinus deformity in walking-age children with clubfoot? A systematic review.

EFORT Open Reviews, 6(5), 354–363. <https://doi.org/https://doi.org/10.1302/2058-5241.6.200110>

- Mustari, M. N., Faruk, M., Bausat, A., & Fikry, A. (2022). Congenital talipes equinovarus: A literature review. *Annals of Medicine and Surgery*, 81, 104394. <https://doi.org/https://doi.org/10.1016/j.amsu.2022.104394>
- Owen, L., Morgan, A., Fischer, A., Ellis, S., Hoy, A., & Kelly, M. P. (2012). The cost-effectiveness of public health interventions. *Journal of Public Health*, 34(1), 37–45. <https://doi.org/10.1093/pubmed/fdr075>
- Parkin, D., & Devlin, N. (2006). Is there a case for using visual analogue scale valuations in cost-utility analysis? *Health Economics*, 15(7), 653–664. <https://doi.org/https://doi.org/10.1002/hec.1086>
- Purba, F. D., Hunfeld, J. A. M., Iskandarsyah, A., Fitriana, T. S., Sadarjoen, S. S., Passchier, J., & Busschbach, J. J. V. (2018). Quality of life of the Indonesian general population: Test-retest reliability and population norms of the EQ-5D-5L and WHOQOL-BREF. *PLoS One*, 13(5), e0197098. <https://doi.org/https://doi.org/10.1371/journal.pone.0197098>
- Purnomo, D., Wibisono, I., & Nurwidianti, R. (2019). Pengaruh Terapi Latihan Dan Pemasangan Bandage Pada Congenital Talipes Equino Varus Bilateral Di Ypac Semarang: Laporan Kasus. *Jurnal Fisioterapi Dan Rehabilitasi*, 3(2), 41–47. <https://doi.org/https://doi.org/10.33660/jfrwhs.v3i2.74>
- Rochmah, T. N., Wulandari, A., Dahlui, M., Ernawaty, & Wulandari, R. D. (2020). Cost Effectiveness Analysis Using Disability-Adjusted Life Years for Cataract Surgery. In *International Journal of Environmental Research and Public Health* (Vol. 17, Issue 16). <https://doi.org/10.3390/ijerph17166010>
- Scope, A., Bhadhuri, A., & Pennington, B. (2022). Systematic Review of Cost-Utility Analyses That Have Included Carer and Family Member Health-Related Quality of Life. *Value in Health*, 25(9), 1644–1653. <https://doi.org/https://doi.org/10.1016/j.jval.2022.02.008>
- Shabtai, L., Specht, S. C., & Herzenberg, J. E. (2014). Worldwide spread of the Ponseti method for clubfoot. *World Journal of Orthopedics*, 5(5), 585–590. <https://doi.org/10.5312/wjo.v5.i5.585>
- Shirley, E. D., Sabharwal, S., Schwend, R. M., Cabral, C., & Spiegel, D. (2016). Addressing the Global Disparities in the Delivery of Pediatric Orthopaedic Services: Opportunities for COUR and POSNA. *Journal of Pediatric Orthopaedics*, 36(1). <https://doi.org/10.1097/BPO.0000000000000400>
- Sinclair, C., Auret, K. A., Evans, S. F., Jane, F., Dormer, S., Wilkinson, A., Greeve, K., Koay, M. A., & Brims, F. (2020). Impact of a Nurse-Led Advance Care Planning Intervention on Satisfaction, Health-Related Quality of Life, and Health Care Utilization Among Patients With Severe Respiratory Disease: A Randomized Patient-Preference Trial. *Journal of Pain and Symptom Management*, 59(4), 848–855. <https://doi.org/https://doi.org/10.1016/j.jpainsymman.2019.11.018>
- Smythe, T., Kuper, H., Macleod, D., Foster, A., & Lavy, C. (2017). Birth prevalence of congenital talipes equinovarus in low-and middle-income countries: a systematic review and meta-analysis. *Tropical Medicine & International Health*, 22(3), 269–285. <https://doi.org/https://doi.org/10.1111/tmi.12833>
- Sum, G., Ho, S. H., Lim, Z. Z. B., Chay, J., Ginting, M. L., Tsao, M. A., & Wong, C. H. (2021). Impact of a patient-centered medical home demonstration on quality of life and patient activation for older adults with complex needs in Singapore. *BMC Geriatrics*, 21(1), 435. <https://doi.org/10.1186/s12877-021-02371-y>
- Talari, K., & Goyal, M. (2020). Retrospective Studies – Utility and Caveats. *Journal of the Royal College of Physicians of Edinburgh*, 50(4), 398–402. <https://doi.org/10.4997/jrcpe.2020.409>
- Viswanathan, M., Kraschnewski, J. L., Nishikawa, B., Morgan, L. C., Honeycutt, A. A., Thieda, P., Lohr, K. N., & Jonas, D. E. (2010). Outcomes and costs of community health worker interventions: a systematic review. *Medical Care*, 792–808.

<https://www.jstor.org/stable/25750559>

Weatherly, H., Drummond, M., Claxton, K., Cookson, R., Ferguson, B., Godfrey, C., Rice, N., Sculpher, M., & Sowden, A. (2009). Methods for assessing the cost-effectiveness of public health interventions: Key challenges and recommendations. *Health Policy*, 93(2), 85–92.

<https://doi.org/https://doi.org/10.1016/j.healthpol.2009.07.012>

Wright, D., Twigg, M., & Thornley, T. (2015). Chronic obstructive pulmonary disease case finding by community pharmacists: a potential cost-effective public health intervention. *International Journal of Pharmacy Practice*, 23(1), 83–85. <https://doi.org/10.1111/ijpp.12161>