



Research

The economic value of an investment in physiotherapy education: a net present value analysis

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KEY WORDS

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ABSTRACT

Questions: What is the economic value for an individual to invest in physiotherapy undergraduate education in Australia? How is this affected by increased education costs or decreased wages? **Design:** A cost-benefit analysis using a net present value (NPV) approach was conducted and reported in Australian dollars. In relation to physiotherapy education, the NPV represents future earnings as a physiotherapist minus the direct and indirect costs in obtaining the degree. Sensitivity analyses were conducted to consider varying levels of experience, public versus private sector, and domestic versus international student fees. Comparable calculations were made for educational investments in medicine and nursing/midwifery. **Results:** Assuming an expected discount rate of 9.675%, investment in education by domestic students with approximately 34 years of average work experience yields a NPV estimated at \$784,000 for public sector physiotherapists and \$815,000 for private sector therapists. In relation to international students, the NPV results for an investment and career as a physiotherapist is estimated at \$705,000 in the public sector and \$736,000 in the private sector. **Conclusion:** With an approximate payback period of 4 years, coupled with strong and positive NPV values, physiotherapy education in Australia is a financially attractive prospect and a viable value proposition for those considering a career in this field. **[Rivers G, Foo J, Ilic D, Nicklen P, Reeves S, Walsh K, Maloney S (2015) The economic value of an investment in physiotherapy education: a net present value analysis. *Journal of Physiotherapy* 61: 148–154]**

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Introduction

In Australia, the number of students choosing to invest in knowledge through higher education is increasing, reaching over half a million in 2012.¹ Physiotherapy, in particular, has grown rapidly, with a 35% increase in students graduating from Australian programs between 2004 and 2006.² These graduating students have enjoyed a job market in which there is a shortage of physiotherapists.³ Physiotherapy shortages are expected to continue as demand grows due to an aging population, population growth and rising incidence of chronic disease.⁴ Despite this growth in the profession, a South Australian survey of 561 physiotherapists found that more than 60% of respondents believed that their remuneration was too low.⁵

Cost-benefit analysis, which is often used to evaluate policies and projects,⁶ can be used to understand the economic value of pursuing physiotherapy education in the context of a lifelong career. In cost-benefit analysis, time-dependent costs and benefits are expressed in money terms, which are based on the preferences of the individuals affected. The main measure of the total value of an economic decision in cost-benefit analysis is its net present value (NPV). NPV is

expressed as the total discounted benefit (value of consumption gained) less the total discounted cost (value of consumption foregone). This comparison is enabled by applying a discount rate to convert future costs and benefits to present values. NPV is consistent with the ideas of both individual time preference, where consumption today is preferred over consumption tomorrow, and risk, in that future cash flows are not guaranteed. In relation to physiotherapy education, the NPV measure compares the future earnings as a physiotherapist minus the costs of obtaining the degree.

Economic analysis of education is not a new concept. Studies have been conducted on the costs of American medical education, as the fees are often prohibitive, with the average student graduating with US\$167,000 of debt.⁷ Using an NPV measure of medical education in 2010, Kahn and Nelling⁸ found that a medical degree is a worthwhile investment up to costs of US\$140,000 per year of study. However, the calculations in these studies have been based on broad assumptions, using modelled data in the absence of actual data. No study of this type has been conducted on physiotherapy in Australia or in any other country.

Physiotherapy education in Australia is growing; there are 17 accredited courses ranging from 4-year undergraduate

baccalaureates to 2-year or 3-year Master or Doctor of Physiotherapy degrees.⁹ Qualified physiotherapists enjoy a wide scope of practice in both the public and private sector, including sports, cardiorespiratory, neurological and paediatrics.¹⁰ A cross-sectional study of 273 Swedish physiotherapy students by Öhman and colleagues¹¹ explored the reasons for choosing a career in physiotherapy. These included an interest in sports and athletics, in working with people, being influenced by interaction with physiotherapists and seeing it as an appealing profession. In that study, none of the students reported having chosen the profession to make a good living. However, it should be considered that higher education in Sweden is free of charge for Swedish students, while Australian physiotherapy students contribute in excess of AUD8,000 per year.^{12,13} If the government funding cuts and fee deregulation occur, these contributions could soon increase to as much as international students pay.¹⁴ McMeeken¹⁵ argues that physiotherapy education is already disadvantaged through funding mechanisms, with its low attrition rates and the high cost of clinical education. As a highly popular course, this would make physiotherapy a prime target for fee increases in a deregulated education market.

Despite the lack of economic data, Szuster and Carson⁵ found that 75% of physiotherapists chose their profession in order to be financially secure. To better understand this concept of economic incentives in career choice, the present study aimed to model the value of physiotherapy education through analysing real survey data using a NPV approach. In doing so, this study was intended to present the financial motivation associated with choosing an investment in physiotherapy education, and how this would be affected by increased education costs or decreased wages. Therefore, the research questions for this study were:

1. What is the economic value for an individual to invest in physiotherapy undergraduate education in Australia?
2. How is this affected by increased education costs or decreased wages?

Method

Design

This study utilised a cost-benefit analysis with a NPV approach. All dollar values presented in the paper are Australian dollars unless otherwise stated. The calculation of NPV was made using

three independent formulas that model present value and are based on known data and listed assumptions (Box 1). These three formulas were combined using the following equation to estimate overall NPV:

$$NPV = PV_{future\ earnings} - (PV_{direct\ costs} + PV_{indirect\ costs})$$

Present values (PV) were calculated for future earnings, as well as both the direct and indirect costs, reflecting the full opportunity cost of undertaking the investment in physiotherapy education. Opportunity costs represent the cost of the option forgone as a result of the decision to undertake the physiotherapy degree. In each formula, future cash flows (C) were weighted by a nominal discount rate (r) to calculate the present value, factoring in risk and time preference. Following recommendations from the Office of Best Practice Regulation,¹⁶ r-values were adjusted to align with market expectation for consumer price index of 2.5%. A sensitivity analysis was conducted for low-risk, expected-risk and high-risk scenarios.¹⁷ These r-values were 5.575%, 9.675% and 12.750%, respectively. Public and private salary growth rates (g) of 3.84% and 3.95%, respectively, were used to estimate future cash-flow earnings. The calculations were modelled for a domestic student commencing a 4-year physiotherapy degree in 2012 and commencing work at 22 years old.

Present value of direct costs

$$PV_{direct\ costs} = \frac{C_d(1+r)}{r-g} \left[1 - \left(\frac{1+g}{1+r} \right)^4 \right]$$

Direct costs are the amounts incurred by students as a direct result of undertaking the university degree. This was modelled as a 4-year growing annuity. This includes university fees, required textbooks, uniform and documentation necessary to obtain the degree. Course fees represent an average of three advertised fees for domestic students for a 4-year undergraduate physiotherapy degree in an Australian university. Other cash flows were calculated based on known figures from a leading Australian physiotherapy program. Net cash flow was calculated to be \$8,527 for 1 year. A growth rate (g) of 2.5% was applied to account for inflation, aligning with market expectations for consumer price index.¹⁷

Box 1. Key values and assumptions used in net present value model.

Variable	Values	Assumptions
Discount rate (r)	<ul style="list-style-type: none"> • Low risk = 5.575% • Expected risk = 9.675% • High risk = 12.75% 	
Growth rate (g)	<ul style="list-style-type: none"> • Consumer price index = 2.5% • Public salary = 3.84% • Private salary = 3.96% 	
Direct cash flow (C _d)	<ul style="list-style-type: none"> • Domestic fee = \$7,960/yr • International fee = \$29,786/yr • Other expenses = \$567/yr 	<ul style="list-style-type: none"> • Direct costs increase with consumer price index
Indirect cash flow (C _i)	<ul style="list-style-type: none"> • Value of time = \$22/hr • Total course time = 3504.5 hr 	
Earnings cash flow (C _e)	<ul style="list-style-type: none"> • Anticipated annual salary increase <ul style="list-style-type: none"> Public = 3.84% Private = 3.96% • Continuing professional development and annual registration costs = \$1,159 	<ul style="list-style-type: none"> • Working full time in either public or private sector • Taxed at Australian tax rates for 2014 to 2015
Time (t)		<ul style="list-style-type: none"> • 4-year degree from 2012 to 2015 without impeded progress • Commence working at 22 years of age
Cost of living	<ul style="list-style-type: none"> • \$25,009 per year 	

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