What is the current evidence for cost of waiting on the outpatient list for management/treatment of orthopaedic/musculoskeletal complaints? A systematic review

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Abstract

Little is known about costs of waiting for orthopaedic outpatient specialist consultations. A subset of papers on costs of waiting was identified from the body of literature identified in a systematic scoping review registered with Prospero (registration CRD42016047332), with the aim of exploring the impact of waiting for orthopaedic outpatient specialist consultations. Medline, Embase, Pubmed, and NHS Economic evaluation database (NHS-EED) were searched from inception until February 2018. The systematic scoping search yielded 139 articles, of which four reported specifically on costs (papers published 2002, 2005, 2009, 2012). All papers reported on hip and/or knee complaints. Cost data was extracted, described and standardised as Australian dollars (AUD$). This review identified limited, non-current evidence on economic costs of waiting for outpatient orthopaedic surgical consultations. Whilst heterogeneous cost items, timing of collection, and dispersion measures constrained synthesis, it appears that direct and indirect costs of waiting may be significant to patients and health systems. Pharmaceuticals were the most common cost (from $263-$1,912). Future research into costs of waiting for orthopaedic conditions should report standardised cost measures, taken at standard time periods throughout the waiting period.

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Key words: cost, orthopaedic, musculoskeletal, management, treatment, waiting list

Received: July 10, 2018; Accepted: July 18, 2018; Published: July 21, 2018
Critical appraisal

The National Health and Medical Research Council hierarchy of evidence was used to rank study designs [16]. Included articles were critically appraised by two independent reviewers using the appropriate Critical Appraisal Skills Program (CASP) checklists [17,18].

Data extraction

Data was extracted on author name and publication date, country, study design, population characteristics (including affected body part), reasons for waiting, waiting time, cost collection date, items, method, perspective, and currency. The cost variables were classified as healthcare costs (e.g. pharmaceutical costs), direct and indirect patient costs (e.g. out-of-pocket on medical and privately funded care), community costs (e.g. meals, community transportation), and productivity loss costs including costs associated with absenteeism, presenteeism or job loss.

Cost standardisation

To deal with potential heterogeneity in the cost data in terms of date of publication, and country, of research, costs were standardised as Australian dollars, using the average of each currency exchange rate in the year that the costs were reported. The converted costs were brought forward in time to the 2016 value, using the Australian consumer price index as a measure of inflationary considerations. To account for differences in time points when costs were collected, all costs were valued at the beginning of the year in which they are reported using the Pharmaceutical Benefits Advisory Committee (PBAC) recommended discount rate of 5% [19] where necessary. When the year for the costs collection was not specified, the costs were valued at two years prior to the publication of the paper, as a normal delay from the collection of the data to the publication [13].

Results

Body of evidence

The systematic scoping search yielded 139 articles, of which four reported specifically on costs (Figure 1). These studies formed the dataset analysed for this paper. The studies comprised one RCT [20] (published 2009) and three prospective observational studies [10,21,22] (published 2005, 2002, 2012 respectively). All studies were of moderate methodological quality [15] (Table 1).

Table 2 reports the cost data and demonstrates its heterogeneity. Perspectives were unclear in two studies [10,20], one used a societal perspective [22] and the remaining one took a patient perspective [21]. Cost collection methods were by questionnaire [20,22] or cost diary [10,21]. All studies investigated patients with hip complaints waiting for joint replacements, and one also included knee complaints (also waiting for joint replacement) [21].

Average waiting periods reported on three studies ranged from 2.4 months to 6.4 month [10,20,22], and waiting for consultation was 5.8 months [22].

Table 1. Aetiology hierarchy

| Papers            | NHMRC | Critical Appraisal | PeDro |
|-------------------|-------|--------------------|-------|
| Tuominen, et al. [20] | II    | N/A                | 8/11  |
| March, et al. [21] | III-3 | 9/14               | N/A   |
| Fielden, et al. [10] | III-3 | 9/14               | N/A   |
| Rolfsen, et al. [22] | III   | 9/14               | N/A   |

Discussion

This review identified four non-current studies, which in itself highlights the need for more current research into an area of increasing interest to patients, society and health systems. Despite their age (the oldest being 16 years old and the most recent being six years old), these studies consistently provide evidence of significant personal healthcare system and societal costs, whilst patients with hip or knee complaints wait for specialist orthopaedic consultation. Patients may consequently incur significantly increased personal direct and indirect costs than they would with more timely treatment, and they may be unable to contribute as anticipated to society because of worsening symptoms. Moreover, the treatment patients require when they eventually reach the ‘top of the waiting list’ may be more complex and costly, than the care required if received earlier in the waiting period. The effectiveness of ‘later’ treatment may also be reduced, if compared to the effects of timely treatment [23].

It is arguable whether, and how, the economic costs associated with lengthy waiting for outpatient specialist consultations are considered in the current demand management approach. For instance, it may be beyond the remit of hospital management to consider the effects of waiting on patients, such as direct and indirect costs of medication and interim treatments, their lifestyle choices, their capacity to self-manage, as well as lost opportunities for family and societal participation, employability and contribution to society. Moreover, the downstream impact on the broader health system may be too distant to be of concern to current governments or hospital management. However, if the evidence from this small number of non-current studies is indicative of the impact that delay in orthopaedic consultation has, it flags the need for alternative, more cost-efficient strategies in the short and long term, to better manage outpatient orthopaedic waiting lists for the benefit of all.
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### Table 2. Current evidence for cost of waiting for management/treatment of orthopedic/musculoskeletal complaints: reported cost items

| Cost perspective | Rolfsen et al. [22] | March et al. [21] | Fielden, et al. [10] | Tuominen, et al. [20] |
|------------------|---------------------|-------------------|---------------------|-----------------------|
| Collection methods | Survey using a questionnaire | Survey using a cost diary | Survey using a cost diary | Survey using a questionnaire |
| **Cost ITEMS** | | | | |
| **Healthcare costs** | | | | |
| Pharmaceutical | ✓ | ✓ | ✓ | ✓ |
| Other costs (healthcare professional visits, tests) | NR | ✓ | NR | NR |
| **Personal costs** | | | | |
| Out-of-pocket (on medical or privately funded care) | NR | ✓ | ✓ | NR |
| Private home help, gardener, private taxi/ travel cost, transportation | NR | ✓ | ✓ | NR |
| Special equipment, Home modifications | NR | NR | NR | NR |
| **Community resources costs** | | | | |
| Meals, transport, home care | NR | NR | NR | NR |
| Transportation | ✓ | NR | NR | NR |
| Home modification | ✓ | NR | NR | NR |
| **Indirect costs** | | | | |
| Method to estimate indirect costs | Used the value-of-lost-leisure-time principle or the replacement costing method when employed | Lost wage identified in the diary or average wages adjusted for times when leisure or household activities were affected, rather than employment |
| **Productivity loss (time away from work or usual activities)** | ✓ | NR | ✓ | NR |
| Informal care | ✓ | NR | NR | NR |
| Disability pension | ✓ | NR | NR | NR |
| P: Reported , NR: Not reported |

* Transformed days in month dividing them by 30.42 days average days in month, NR: Not reported, CI: Confidence interval, SD: Standard deviation

### Table 3. Current evidence for cost of waiting for management/treatment of orthopedic/musculoskeletal complaints: reported costs (AUD)

| Country | Sweden | Australia | New Zealand | Finland |
|---------|--------|-----------|-------------|---------|
| Study design | Prospective | Prospective | Prospective | Randomised control trial (RCT) |
| Population: Age | 26-95 years | 63.3 (SD=11.7) | 63.4 (SD=7) | 35-85 years | 66 (SD=9.8) | 64 (SD=10.1) |
| Population: Size | 2,635 | 76 | 98 | 66 | 122 | 92 | 170 |
| Body part | Hip | Hip | Knee | Hip |
| Waiting reason | Consultation | Surgery | Surgery | Surgery |
| Mean of waiting time (month)* | 5.8 [95% CI: 5.4-6.0] | 4.7 [95% CI: 4.6-4.9] | NR | NR | NR | NR |
| Costs | | | | |
| Short waiting group (SWT) ≤ 3 month | | | | |
| No fixed waiting group (NFWT): > 3 month | | | | |
| Healthcare costs | 2,188-3,107 | 1,928 [95% CI: 1,151-2,706] | 1,133 [95% CI: 522-1,743] | 404 (Median) | 503 (Median) | 1,912 | Mean of 12 month |
| Pharmacological | 263 | 1,095 [95% CI: 633-1,536] | 566 [95% CI: 261-872] | 404 | 503 | 1,912 | 621 [95% CI: 524-736] | 670 [95% CI: 509-882] |
| Other costs | 2,384 [95% CI: 1,925-2,844] | 833 [95% CI: 498-1,170] | 567 [95% CI: 261-871] | NR | NR | NR | NR | NR |
| Personal costs | 1,326 [95% CI: 1,100-1,552] | 1,468 [95% CI: 876-2,060] | 839 [95% CI: 387-1,292] | 312 | 848 | 2,758 | NR | NR |
| Community resources costs | 1,477 [95% CI: 1,266-1,688] | 947 [95% CI: 565-1,329] | 3,177 [95% CI: 1,464-4,890] | NR | NR | NR | NR | NR |
| Indirect costs | 10,530 [95% CI: 9,813-11,187] | NR | 5,194 [95% CI: 2,992-6,805] | NR | NR | NR | NR | NR |
| Average total costs | 15,980 [95% CI: 14,427-17,533] | 4,343 [95% CI: 2,592-6,095] | 5,149 [95% CI: 2,372-7,925] | 10,414 | 509-882 | 670 [95% CI: 509-882] |

* Transformed in days in month dividing them by 30.42 days average days in month, NR: Not reported, CI: Confidence interval, SD: Standard deviation
This review found heterogeneity, inconsistency, missing information and lack of comparability in how costs of waiting were defined, measured and calculated. Consistent definitions of waiting are required (for instance ‘short’ or ‘long’ waiting), and future research should attempt to apply a standardized format of costs for economic analysis, to improve comparability and transferability of findings. Costs should also be routinely collected on productivity loss. Whilst absenteeism from work is well recognised and able to be recorded, there is also the potential for loss for productivity when people suffering orthopaedic conditions are present at work (‘presenteeism’), but not able to perform to capacity due to pain and/or disability [14,24].

This review identified papers reporting only on patients awaiting total hip or knee replacement. These findings are not generalisable to other musculoskeletal complaints (such as upper limb or spine) because of different pathologies and likely impact on daily activities. Moreover, it is anticipated that current costs would be higher than those reported in the non-current included literature because of inflation and increased unmet needs for patients with chronic conditions.

Conclusion

On this limited, non-current body of evidence, it appears that placing patients on an outpatient waiting list for a specialist consultation for an orthopaedic condition is not cost-neutral. Given the ageing population in Australia, and the increasing prevalence of musculoskeletal conditions requiring specialist consultation, it is essential that better ways of managing patients onto, and through, the outpatient waiting list be identified. Otherwise lists will continue to lengthen, more people will be impacted on by the need to wait for care.
and costs of waiting will escalate. Better and more standard ways of collecting cost data will improve international understanding of which costs are incurred, at which point whilst waiting, and how much these are, whilst patients are on orthopaedic waiting lists. This knowledge will assist policy makers and health service planners to identify better ways of decreasing costs of waiting, and minimize the impact of waiting on individuals, health systems and society.

Authorship and Author’s contribution

AT and JM for literature searching, critical appraisal; AT, JM, KG for debating and organizing the findings; drafting, reading subsequent drafts and editing the Manuscript.

Acknowledgments

Data management and formatting support from Ashley Fulton, Heath Pillen and Holly Bowen.

Funding information

No funding.

Competing interest

Authors declare no competing interests.

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