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INTRODUCTION

The economic burden of breast cancer encompasses various aspects, including healthcare costs, productivity losses, and the financial impact on patients and their families (Arnold 2022).

Two well-known CDK4/6 inhibitors, palbociclib and ribociclib, have received regulatory approval (Braal 2021) for the treatment of advanced breast cancer.

The therapeutic effectiveness and mechanisms of action of CDK4/6 inhibitors are comparable, while there may be variations in pharmacokinetics, their medication interactions, and side effect profiles (Adon 2021). Depending on the unique patient features, treatment objectives, and healthcare professional preferences, one may choose amongst these CDK4/6 inhibitors.

OBJECTIVE

To provide a comprehensive review on cost-effectiveness of palbociclib in breast cancer patients and the HCRU associated with the treatment.

METHODS

Study design

A systematic literature review was conducted, for studies published till November 2023.

Data Source & assessment of study quality

- PubMed, DOAJ, Google Scholar.
- Research articles were assessed qualitatively using the CHEERS and the ECOBIAS checklist

Outcomes

Palbociclib and comparator related total costs, QALY, LY, ICER and HCRU

RESULTS

- There were 24 studies extended across Brazil, Canada, China, Germany, Iran, Italy, Japan, Mexico, Qatar, Spain, Switzerland, UK and the USA.
- Majority of the studies (n=9) explored the cost-effectiveness of the treatment from the perspective of the healthcare system and payer perspective (Fig 1).
- The time-horizon ranged from 6-40 years, while some studies used full-life cycle to simulate costs and health outputs of patients.
- The total quality-adjusted life years (QALYs) associated with the regimen ranged from 1.92 to 5.72 over a lifetime-horizon.
- The total life years (LYs) associated with the regimen ranged from 1.5 to 5.9 over a lifetime-horizon.
- Palbociclib was cost-effective in three studies (13%) (Fig 2).
- Six studies reported that ribociclib was dominant over palbociclib in terms of cost-effectiveness.
- Nine studies reported that palbociclib was not cost-effective as compared to endocrine therapy.
- One study reported that cost-effectiveness of everolimus and palbociclib are equivalent.
- One study each reported that placebo + NSAI, abemaciclib and anastrozole were cost-effective as compared to palbociclib.
- Two studies reported that placebo + fulvestrant was cost-effective than palbociclib regimen.

Figure 1: Distribution of the perspective used across studies

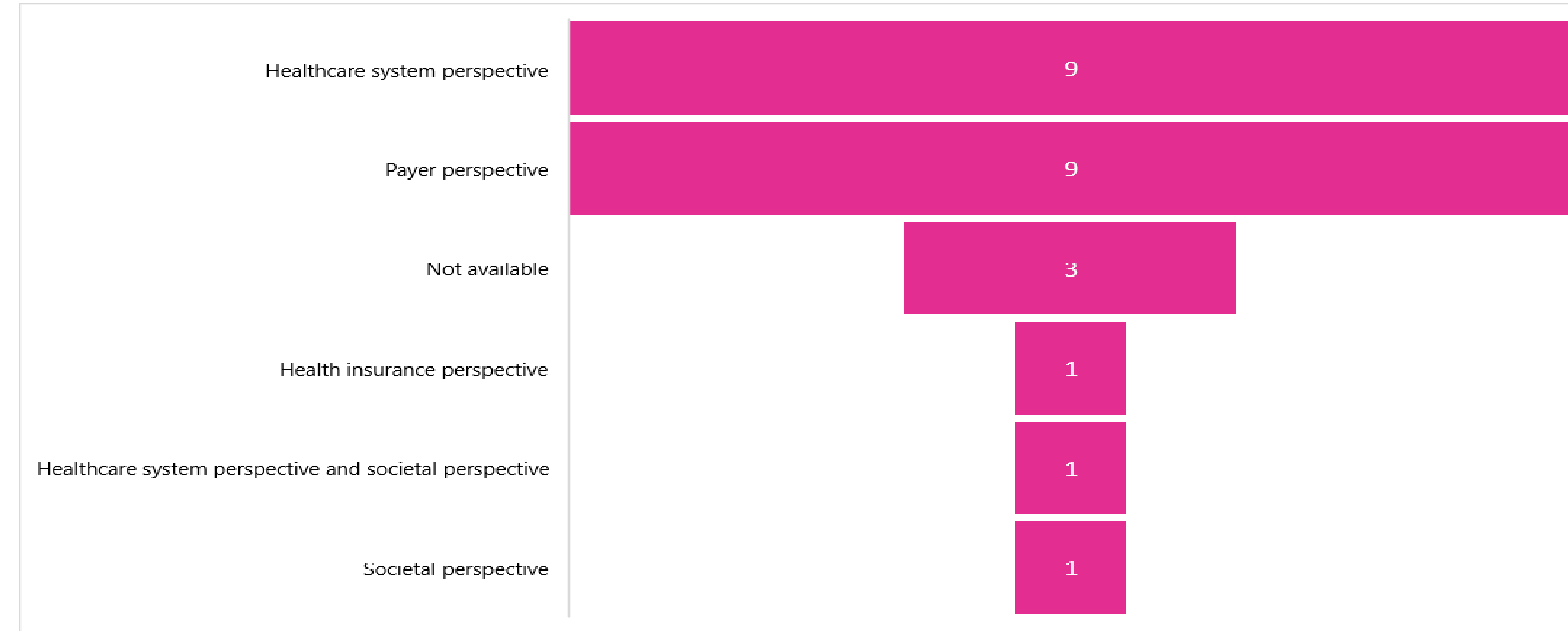


Figure 2: Distribution of cost-effectiveness of Palbociclib in studies Figure 3: Studies ranked based on the CHEERS checklist score

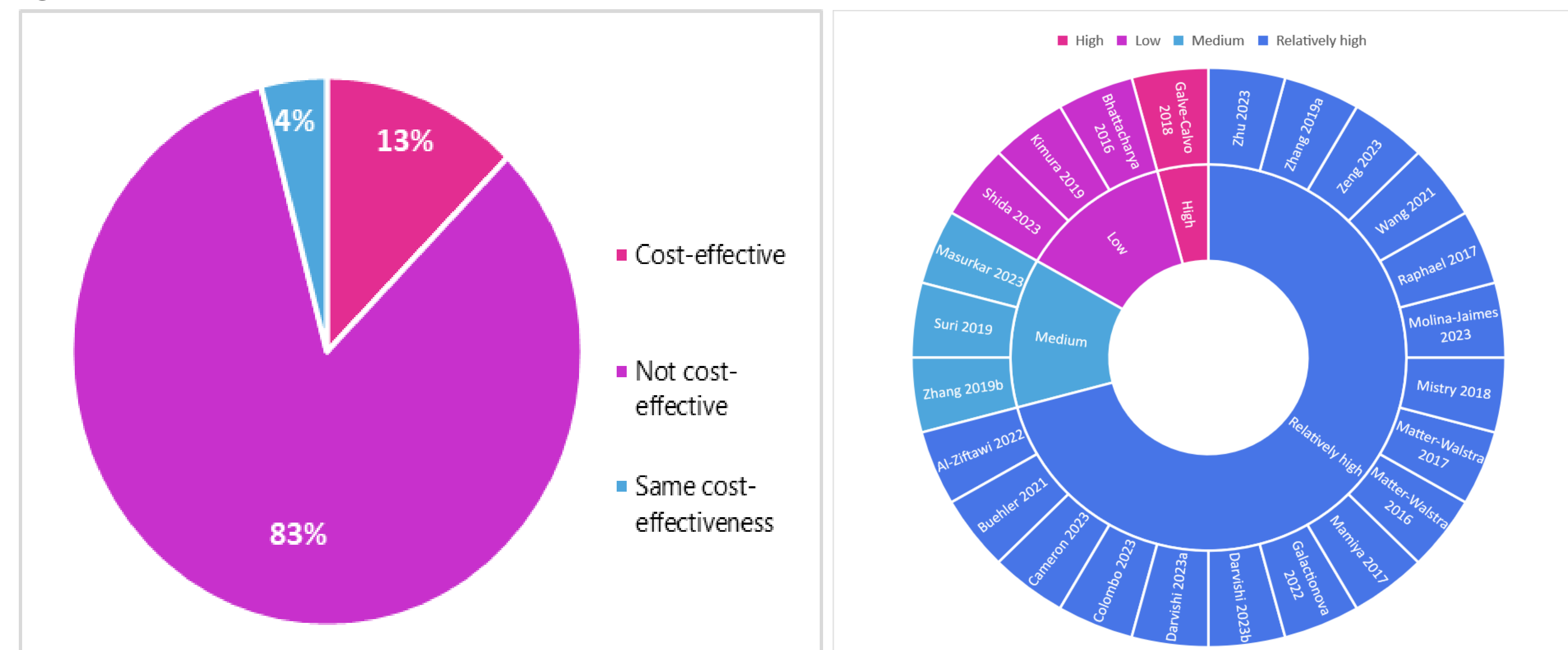
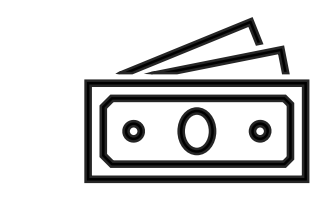


Table 1: ECO-BIAS checklist for all studies

Authors	Narrow perspective bias	Inefficient comparator bias*	Cost measurement omission bias	Intermittent data collection bias	Invalid valuation bias	Ordinal ICER bias	Double-counting bias	Inappropriate discounting bias	Limited sensitivity analysis bias†	Sponsor bias	Reporting and dissemination bias	Structural assumptions bias	N treatment comparator bias*	Wrong model bias	Limited time horizon bias	Bias related to data identification	Bias related to baseline data	Bias related to treatment effects	Bias related to quality-of-life weights (utilities)	Non-transparent data incorporation bias	Limited to scope bias†	Bias related to internal consistency	
Colombo et al., 2023	Y	Y	Y	Y	Y	Y	NA	Y	PA	Y	NA	Y	Y	Y	Y	Y	Y	Y	PA	Y	PA	Y	
Zhu et al., 2023	Y	Y	Y	Y	Y	Y	NA	Y	PA	N	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PA	Y
Darvishi et al., 2023b	Y	Y	Y	Y	Y	Y	NA	Y	PA	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PA	Y
Darvishi et al., 2023a	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Zeng et al., 2023	Y	Y	Y	Y	Y	Y	NA	Y	PA	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PA	Y
Molina-Jaimes et al., 2023	Y	Y	Y	Y	Y	Y	NA	N	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Masurkar et al., 2023	Y	Y	Y	Y	Y	Y	NA	PA	N	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	
Shida et al., 2023	NA	PA	PA	NA	PA	PA	NA	NA	NA	NA	Y	Y	Y	Y	NA	PA	NA	PA	PA	PA	NA	Y	
Cameron et al., 2023	Y	Y	Y	Y	Y	Y	NA	PA	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Al-Ziftawi et al., 2022	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Galacionova et al., 2022	Y	Y	Y	Y	Y	Y	NA	PA	Y	Y	NA	NA	Y	NA	PA	Y	Y	Y	Y	Y	Y	Y	Y
Wang et al., 2021	Y	Y	Y	Y	Y	Y	NA	PA	PA	N	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PA	Y
Buehler et al., 2021	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Suri et al., 2019	Y	Y	Y	Y	Y	Y	NA	N	Y	N	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Zhang et al., 2019b	NA	Y	Y	Y	Y	Y	NA	Y	NA	Y	NA	PA	Y	Y	NA	Y	Y	Y	Y	Y	Y	NA	Y
Zhang et al., 2019a	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Kimura et al., 2019	N	Y	Y	Y	Y	Y	NA	N	N	N	NA	NA	Y	NA	NA	Y	Y	N	N	Y	N	N	
Galve-Calvo et al., 2018	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Mistry et al., 2018	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Raphael et al., 2017	Y	Y	Y	Y	Y	Y	NA	PA	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PA	Y
Mamiya et al., 2017	Y	Y	Y	Y	Y	Y	NA	Y	N	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	N	Y	
Matter-Walstra et al., 2017	Y	Y	Y	Y	Y	Y	NA	PA	PA	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PA	Y
Matter-Walstra et al., 2016	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PA	Y
Bhattacharya et al., 2016	NA	PA	PA	PA	PA	PA	NA	NA	NA	NA	NA	PA	Y	Y	NA	PA	NA	PA	NA	NA	NA	PA	Y

- Drug cost was the key contributor to total costs in majority of the studies.
- In most studies, ribociclib's cost-effectiveness stems from lower initial drug costs, making it a long-term economical choice over palbociclib.
- HCRU comparison between palbociclib and ribociclib cohorts yielded no observable differences for the number of in-patient admissions [incidence rate ratios (IRR): 1.13], in-patient days (IRR: 0.86), days with emergency-room services (IRR: 1.56), or days with out-patient services.
- Majority of the included studies ranked "relatively high" on the CHEERS checklist (Fayanju 2021), indicating that these studies used rigorous standards of reporting and methodology and provide valuable insights (Fig 3).
- The ECOBIAS checklist contains 22 items, where each item was graded as yes, no, partly unclear or not applicable, where yes and no referred to high and low risk of bias, respectively (Adarkwah 2016). The checklist indicated that risk of bias was mostly low for most items. (Table 1)

CONCLUSION



There were no observable differences seen between palbociclib and ribociclib regarding HCRU, and ribociclib continues to be cost-effective as compared to palbociclib.



Palbociclib could become a cost-effective treatment option once it's included in the medical insurance catalog or covered by patient assistance program according to the Chinese healthcare perspective.



Differences in price weights and analytical perspectives between countries can limit the generalizability of pharmacoeconomic analyses, underscoring the importance of tailored consideration for accurate interpretation.

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- Scan the QR code in the right to get the reference to all the studies used for the evaluation.



Scan to get access to all the included studies