BMJ Open Patients' and doctors' preferences in early-stage triple-negative breast cancer treatment in Asia–Pacific: a multiterritory discrete choice experiment using a cross-sectional survey

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ABSTRACT

Objectives This study aimed to assess preferences of patients and doctors regarding treatment attributes for early-stage triple-negative breast cancer (eTNBC) in the Asia–Pacific region.

Design A discrete choice experiment (DCE) by crosssectional survey was conducted with patients and doctors. Key attributes relevant to eTNBC treatment decisionmaking were verified through a consultative process with clinical experts. The levels and description of seven attributes were refined through cognitive interviews. A Defficient fractional-factorial design was employed to create 15 choice sets with seven key attributes.

Setting An online web-based DCE with the 15 choice sets was developed and made available to participants in Australia, Japan, Korea, the Philippines and Taiwan.

Participants The final dataset comprised 115 patients who self-reported a diagnosis of eTNBC and 86 medical oncologists, breast and general surgeons with at least five years of experience managing eTNBC patients.

Primary outcomes Patients' and doctors' preferences on seven attributes: pathological complete response (pCR), disease-free/event-free survival (DFS/EFS), chance of undergoing breast-conserving surgery after receiving anticancer treatment, febrile neutropenia, peripheral sensory neuropathy (PSN), diarrhoea and irreversible endocrine-related side effects requiring lifelong medication. Data were analysed using a mixed logit model to determine preference weights for attribute levels, which were then used to compute the relative importance score (RIS) for each attribute.

Results The median age of patients was 44.0 (IQR 38.0–56.5) years. Most patients (68%) were married, and 77% had children. Additionally, 40% were employed full-time, and 70% held a college degree. Nearly half (46%) were diagnosed before the age of 40. Among the doctors, 58% were medical oncologists and the remaining breast or general surgeons. pCR, DFS/EFS and PSN were the three most important attributes in both doctor and patient groups. pCR had the highest weighted preference among patients and doctors (RIS, 28.5 and 32.9, respectively). In general, patients assigned more weight to safety attributes

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This is the first study in Asia–Pacific that used a discrete choice experiment (DCE), a well-recognised method, to quantify patients' and doctors' preferences in attributes for early-stage triple-negative breast cancer (eTNBC) treatment in five territories in Asia–Pacific.
- ⇒ The use of the same attributes and levels in the patients' and doctors' DCE enabled comparison of their perspectives.
- ⇒ A multi-step approach was followed to identify attributes and levels, which involved a thorough literature review, advisory boards and cognitive interviews with eTNBC patients and treating doctors.
- ⇒ Participants were recruited by convenience sampling and may not be representative of all eTNBC patients and treating doctors in Asia–Pacific.

compared with doctors, while doctors assigned more weight to efficacy attributes than patients did. Surgeons assigned more weight to irreversible endocrine-related side effects than medical oncologists (RIS, 14.4 vs 5.4). Differences in preferences within the regions were noted. **Conclusions** While our study revealed a concordance between patients' and doctors' ranking of the seven assessed treatment attributes, patients generally assigned greater emphasis on safety-related attributes in comparison to doctors.

INTRODUCTION

Breast cancer continues to be a global health challenge, with an estimated 2.3 million new cases diagnosed in 2020 alone, according to GLOBOCAN 2020 data.¹ In the Asia–Pacific region, breast cancer incidence rates are among the highest worldwide,² particularly for triple-negative breast cancer (TNBC), characterised by its aggressive clinical

To cite: Lai J-I, Jung KH, Shimizu C, *et al.* Patients' and doctors' preferences in earlystage triple-negative breast cancer treatment in Asia–Pacific: a multi-territory discrete choice experiment using a crosssectional survey. *BMJ Open* 2025;**15**:e088505. doi:10.1136/ bmjopen-2024-088505

Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (https://doi.org/10.1136/ bmjopen-2024-088505).

Received 08 May 2024 Accepted 07 February 2025



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Correspondence to Professor Yoland Antill; yoland.antill@monash.edu behaviour, high histologic tumour grade and increased risk of relapse and distant recurrence.³⁴

Treatment approaches to early-stage TNBC (eTNBC) include surgery, chemotherapy, radiation therapy, with the recent addition of immunotherapy for high-risk disease, and several targeted therapies currently under clinical trials. Chemotherapy is the mainstay of systemic treatment for TNBC.⁴⁵ There is a growing trend towards using neoadjuvant chemotherapy as decisions for optimal surgical, radiation or chemotherapy are increasingly tailored based on the initial response to neoadjuvant chemotherapy, while adjuvant chemotherapy is recommended in patients with residual tumour after neoadjuvant treatment.4-6

Treatment regimens for eTNBC are associated with different efficacy-tolerability profiles. Furthermore, besides clinical benefits, patients' perceptions of treatment value are also influenced by other factors that affect their quality of life, and this is a dimension that is increasingly acknowledged in value assessment frameworks." The majority of preference studies to date have investigated patients' preferences in treatment attributes for metastatic breast cancer; additionally, these studies were focused on Western countries.^{8–10} There is thus limited information on how patients perceive treatment efficacy and tolerability and other factors deemed crucial for making their treatment choices, particularly for TNBC. Few studies assessed the alignment of patients' preferences for the treatment of eTNBC with that of doctors' that would help inform shared decision-making. With the accumulation of recent data to support the addition of immunotherapy to cytotoxic chemotherapy as a new treatment option, it is timely to understand patients' perception of eTNBC treatment attributes and the extent to which their preferences align with doctors' judgement, especially in Asia-Pacific.

Using a discrete choice experiment (DCE) conducted in Australia, Japan, Korea, the Philippines and Taiwan, this study aimed to characterise and quantify patients' and doctors' preferences for eTNBC treatment attributes related to efficacy and safety, in order to examine alignment in preferences for eTNBC treatment attributes between patients and doctors in the Asia-Pacific region and across different territories.

METHODS

DCE

In the DCE survey, respondents were presented with a series of choice tasks (questions), each comprising two hypothetical treatment profiles that contained various combinations of treatment attributes (ie, benefits and risks). For each choice task, respondents were asked to select the profile they found most preferable. The execution of this DCE study adhered to the guidelines set forth by the International Society for Pharmacoeconomics and Outcomes Research in their comprehensive framework for proficient research conduct in conjoint analysis.¹¹

Attributes and levels

A preliminary list of 30 attributes and their levels was identified based on a targeted literature review of eTNBC. A consultative process with key opinion leaders in this field (co-authors) from Australia, Japan, Korea, the Philippines and Taiwan was then used to identify key attributes and levels most relevant to making treatment choices for eTNBC. After deliberating on the relevance and significance of these attributes, seven were decided on for use in the DCE, and the description of these attributes and levels was refined through cognitive interviews. Cognitive interviews Initial cognitive interviews were conducted using a struc-tured discussion guide with a total of 10 patients with

eTNBC and 15 doctors from Australia, Japan, Korea, the Philippines and Taiwan. The aim of the interviews was to assess participants' understanding of the language and phrasing of survey questions. Electronic written consent was obtained from participants prior to the interviews. Interviews were conducted via online video conference and in participants' native language.

The seven key attributes were identified, each with different levels (table 1) to describe the TNBC treatment alternatives. The key attributes were pathological complete response (pCR), disease-free/event-free survival (DFS/ EFS), chances of undergoing breast-conserving surgery (BCS) after receiving anticancer treatment, febrile neutropenia, peripheral sensory neuropathy, diarrhoea and irreversible endocrine-related side effects requiring id data min lifelong medication.

Construction of the DCE questionnaire

The combination of these attributes and levels resulted in a G total of 1458 hypothetical scenarios $(3^6 \times 2^1)$ that exceeded \geq the practical limits for inclusion within a questionnaire. Therefore, a fractional factorial design approach was used to systematically generate a set of optimal scenarios in B SAS software version 9.4. The macro %Mktruns was used to compute appropriate design dimensions, followed by using the macro %Mktex to generate requisite combinations.¹² The experimental design ultimately consisted of 15 distinct choice pairs (choice sets).

The survey instrument included an introduction of choice sets with a description of the attributes and their of levels. Each respondent answered 15 trade-off questions, **G** exemplified in online supplemental figure 1.

Beyond the DCE questions, we also collected the studyrelevant baseline characteristics for each study participant, including information on patients' sociodemographic (age, race, educational level) and clinical characteristics (time since diagnosis, cancer stage, past treatment) and doctors' professional experience (specialty, practice setting). The survey instrument was translated into local languages and implemented via an online survey platform.

Table 1 Attributes and levels tested	
Attributes	Levels
Disease-free/event-free survival	12 months 18 months 24 months
Pathological complete response (pCR)	30% probability of achieving pCR 50% probability of achieving pCR 70% probability of achieving pCR
Chances of undergoing breast-conserving surgery (BCS) after receiving anticancer treatment	30% chance of undergoing BCS 50% chance of undergoing BCS 70% chance of undergoing BCS
Febrile neutropaenia	5% risk of experiencing febrile neutropenia 10% risk of experiencing febrile neutropenia 20% risk of experiencing febrile neutropenia
Peripheral sensory neuropathy	5% risk of experiencing peripheral sensory neuropathy 20% risk of experiencing peripheral sensory neuropathy 40% risk of experiencing peripheral sensory neuropathy
Diarrhoea	10% risk of experiencing diarrhoea 25% risk of experiencing diarrhoea 50% risk of experiencing diarrhoea
Irreversible endocrine-related side effects requiring lifelong medication	0% chance of developing irreversible endocrine-related side effects 8% chance of developing irreversible endocrine-related side effects

Sample size and participant recruitment

The sample size of the DCE study was estimated based on a common rule of thumb formula $(n \times t \times a)/c \ge 500$, with n as the number of respondents; t, number of choice sets; a, number of alternatives per set; and c, largest number of levels for any one attribute.¹³ Considering respondent fatigue, we decided on a maximum of 15 choice sets, two treatment alternatives and three levels, which required a minimum sample size of at least 50 for each group. Based on the recommended sample size calculation and for representation of the territories included, our study intended to recruit 120 patients and 86 doctors.

Between April 2022 and June 2023, a targeted recruitment approach was used where personalised email invitations were sent to medical oncologists, general and breast surgeons in Australia, Japan, the Philippines and Taiwan via commercial panels Medical Opinion Leaders, Plamed Asia and RDCK panel.¹⁴¹⁵ Clinicians on these commercial panels had previously participated in similar surveys and opted in to being contacted for future research. In Korea, a recruiter contacted relevant doctors in Tier 2 and Tier 3 hospitals based on publicly available information to seek their interest to participate. Personalised email invitations were then sent to them. In Australia and Japan, personalised email invitations were sent to cancer patients via commercial consumer panels with members profiled on health conditions—CRNRSTONE and Asmarq.¹⁶¹⁷ In the Philippines, Taiwan and Korea, patients were identified through referral from doctors who participated in the study and with referrals from a breast cancer patient advocacy group in Korea. Doctors obtained patients' approval to refer their contact details to a recruiter who then contacted the patients to explain details before personalised email invitations were sent to them.

Personalised email invitations sent to potential participants contained a link to an online questionnaire. Participants were first directed to a preliminary screening section

Protected by copyright, including where they answered a series of questions to assess their eligibility based on the study's inclusion and exclusion uses rela criteria. Those who met the specified criteria proceeded to the main survey. Participants indicated their consent to proceed with the survey via a checkbox on the online questionnaire.

To be eligible, patients had to be (1) a woman who đ is ≥ 18 years old, (2) self-reported a clinician-confirmed diagnosis of eTNBC (stage 1 to 3) and (3) able to read and understand the questionnaire in her local language. Patients were excluded if they had been exposed to immunotherapy. Doctors had to be (1) a medical oncologist, breast or general surgeon; (2) had to have ≥ 5 years \blacksquare of experience managing patients with eTNBC; and (3) spent $\geq 50\%$ of their time in direct patient care. After ≥ excluding five patients who indicated that they received training, and similar technologies hormone therapy, which was inconsistent with the treatment for TNBC, the final sample included 115 patients and 86 doctors.

Patient and public involvement statement

Patients or the public were not involved in the design, conduct or reporting of this study.

Data analysis

A mixed logit model was used to estimate the preference weight for each attribute level in patients and doctors, where a more positive preference weight indicates a stronger preference for that attribute level.¹⁸ Analysis was performed in STATA/IC version 14.2 software.

The relative importance score of attributes was calculated to compare the relative influence of each attribute on patients' and doctors' choices. The relative attribute importance score is the proportion of the total variance explained by the individual attribute, expressed as a percentage.

Relative importance = $\frac{\text{Difference in prefe}}{2}$ x 100% e

 Table 2
 Sociodemographic characteristics and early-stage triple-negative breast cancer-related medical history of patients and professional characteristics of doctors

Sociodemographic characteristics of patients	Overall (n=115)	AU (n=16)	KR (n=30)	JP (n=20)	PH (n=19)	TW (n=30)
Median (Q1–Q3) age, years	44.0 (38.0–56.5)	57.0 (51.5–64.0)	47.5 (41.0–57.0)	47.0 (40.8–57.3)	50.0 (39.0–56.5)	38.0 (34.3–42.8)
Race						
Asian, n (%)	101 (87.8)	2 (12.5)	30 (100.0)	20 (100.0)	19 (100.0)	30 (100.0)
Caucasian, n (%)	13 (11.3)	13 (81.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Aboriginal, n (%)	1 (0.9)	1 (6.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Marital status						
Single, n (%)	19 (16.5)	2 (12.5)	4 (13.3)	3 (15.0)	1 (5.3)	9 (30.0)
Married domestic partner, n (%)	78 (67.8)	6 (37.5)	22 (73.4)	15 (75.0)	14 (73.7)	21 (70.0)
Divorced/ separated/widowed, n (%)	18 (15.7)	8 (50.0)	4 (13.3)	2 (10.0)	4 (21.1)	0 (0.0)
Have children, n (%)	88 (76.5)	14 (87.5)	24 (80.0)	15 (85.0)	16 (84.2)	19 (63.3)
Median (Q1–Q3) age of youngest child, years	15.0 (8.5–25.5)	25.0 (15.0–33.8)	20.0 (12.5–29.3)	21.5 (7.5–27.5)	17.0 (12.0–25.5)	7.0 (5.0–12.5)
Educational level						
Primary high school, n (%)	15 (13.0)	4 (25.0)	9 (30.0)	1 (5.0)	1 (5.3)	0 (0.0)
Certification programme/vocational school, n (%)	12 (10.4)	3 (18.8)	0 (0.0)	6 (30.0)	3 (15.8)	0 (0.0)
University degree, n (%)	80 (69.6)	6 (37.4)	19 (63.3)	13 (65.0)	14 (73.7)	28 (93.3)
Postgraduatee degree, n (%)	8 (7.0)	3 (18.8)	2 (6.7)	0 (0.0)	1 (5.3)	2 (6.7)
Employment status						
Full-time, n (%)	46 (40.0)	2 (12.5)	6 (20.0)	7 (35.0)	3 (15.8)	28 (93.3)
Part-time, n (%)	9 (7.8)	4 (25.0)	2 (6.6)	0 (0.0)	1 (5.3)	2 (6.7)
Homemaker, n (%)	32 (27.8)	2 (12.5)	14 (46.7)	7 (35.0)	9 (47.3)	0 (0.0)
Retired unemployed leave of absence, n (%)	18 (15.7)	4 (25.0)	5 (16.7)	3 (15.0)	6 (31.6)	0 (0.0)
Others, n (%)	10 (8.7)	4 (25.0)	3 (10.0)	3 (15.0)	0 (0.0)	0 (0.0)
Duration since diagnosis of eTNBC						
≤2 years, n (%)	63 (54.8)	0 (0.0)	18 (60.0)	11 (55.0)	14 (73.6)	20 (66.7)
2 to 5 years, n (%)	30 (26.1)	6 (37.5)	7 (23.3)	4 (20.0)	4 (21.1)	9 (30.0)
5 to 10 years, n (%)	10 (8.7)	4 (25.0)	0 (0.0)	4 (20.0)	1 (5.3)	1 (3.3)
≥10 years, n (%)	12 (10.4)	6 (37.5)	5 (16.7)	1 (5.0)	0 (0.0)	0 (0.0)
Age at diagnosis						
≤40 years, n (%)	53 (46.1)	3 (18.8)	11 (36.7)	7 (35.0)	7 (36.8)	25 (83.3)
40 to 59 years, n (%)	52 (45.2)	11 (68.8)	16 (53.3)	12 (60.0)	8 (42.1)	5 (16.7)
≥60 years, n (%)	10 (8.7)	2 (12.5)	3 (10.0)	1 (5.0)	4 (21.1)	0 (0.0)
Stage of eTNBC at diagnosis						
Stage 1, n (%)	43 (37.4)	5 (31.3)	9 (30.0)	8 (40.0)	0 (0.0)	21 (70.0)
Stage 2, n (%)	51 (44.3)	7 (43.8)	14 (46.7)	10 (50.0)	11 (57.9)	9 (30.0)
Stage 3, n (%)	19 (16.5)	4 (25.0)	6 (20.0)	1 (5.0)	8 (42.1)	0 (0.0)
Others [†] / don't know, n (%)	2 (1.7)	0 (0.0)	1 (3.3)	1 (5.0)	0 (0.0)	0 (0.0)
History of breast surgery						
Mastectomy, n (%)	35 (30.4)	6 (37.5)	5 (16.7)	8 (40.0)	14 (73.7)	2 (6.7)
BCS, n (%)	50 (43.5)	9 (56.3)	13 (43.3)	11 (55.0)	2 (10.5)	15 (50.0)
Yes but unaware what type, n (%)	5 (4.4)	1 (6.2)	0 (0.0)	0 (0.0)	1 (5.3)	3 (10.0)
Did not undergo surgery, n (%)	25 (21.7)	0 (0.0)	12 (40.0)	1 (5.0)	2 (10.5)	10 (33.3)
Receiving breast cancer treatment at the time of the su	rvey				. ,	. ,
Chemotherapy, n (%)	69 (60.0)	0 (0.0)	15 (50.0)	12 (60.0)	18 (94.7)	24 (80.0)
Others [‡] , n (%)	14 (12.2)	2 (12.5)	5 (16.7)	2 (10.0)	0 (0.0)	5 (16.7)
None, n (%)	32 (27.8)	14 (87.5)	10 (33.3)	6 (30.0)	1 (5.3)	1 (3.3)
Professional experience of doctors	Overall (n=86)	AU (n=15)	KR (n=20)	JP (n=16)	PH (n=15)	TW (n=20)
Specialty	. /	. ,	. ,	. ,	. ,	. ,

Continued

Sociodemographic characteristics of patients	Overall (n=115)	AU (n=16)	KR (n=30)	JP (n=20)	PH (n=19)	TW (n=30)
Medical oncologist, n (%)	50 (58.1)	12 (80.0)	10 (50.0)	10 (62.5)	8 (53.3)	10 (50.0)
General surgeon, n (%)	13 (15.2)	2 (13.3)	0 (0.0)	0 (0.0)	7 (46.7)	4 (20.0)
Breast surgeon, n (%)	23 (26.7)	1 (6.7)	10 (50.0)	6 (37.5)	0 (0.0)	6 (30.0)
Practice						
Public/government hospital, n (%)	22 (25.6)	6 (40.0)	2 (10.0)	5 (31.3)	2 (13.3)	7 (35.0)
Private hospital or clinic, n (%)	27 (31.4)	2 (13.3)	0 (0.0)	6 (37.4)	11 (73.4)	8 (40.0)
University hospital or academic institute, n (%)	37 (43.0)	7 (46.7)	18 (90.0)	5 (31.3)	2 (13.3)	5 (25.0)
Post-training experience managing eTNBC patients						
5–10 years, n (%)	30 (34.9)	8 (53.3)	9 (45.0)	2 (12.5)	5 (33.3)	6 (30.0)
11–15 years, n (%)	21 (24.4)	4 (26.7)	4 (20.0)	3 (18.8)	7 (46.7)	3 (15.0)
>15 years, n (%)	35 (40.7)	3 (20.0)	7 (35.0)	11 (68.7)	3 (20.0)	11 (55.0)

*Freelancer, self-employed, home-call counsellor

Continued

+Stage II to III

‡Radiation, surgery, don't know

BCS, breast-conserving surgery; eTNBC, early-stage triple-negative breast cancer

Due to the smaller sample sizes of each subgroup, a conditional logit model was used to estimate preference weights in patients' and doctors' subgroups by territory, doctors' specialty and patients' clinical characteristics, and relative importance score calculated to compare relative influence of attributes within subgroups.

RESULTS

Baseline characteristics

Patient characteristics

Patient characteristics (n=115) are shown in table 2. Overall, the median age of patients was 44.0 (IQR 38.0-56.5) years. 68% of patients were married, 77% had children, 40% employed full-time and 70% had a college degree. 37% of patients were diagnosed at stage 1, 44% in stage 2 and 17% in stage 3. 55% of patients were diagnosed with eTNBC within 2 years prior to the study, and 6% had experienced recurrence of TNBC before. 74% of patients had undergone breast surgery (mastectomy or BCS), and 83% had received chemotherapy before. At the time of survey participation, 72% were receiving treatment. Across the territories, all patients in Australia had received their eTNBC diagnosis more than 2 years prior to study participation, while the majority of patients in remaining territories received their diagnosis within 2 years of study participation. 42% of patients in the Philippines were diagnosed at stage 3, while the majority of patients in remaining territories were diagnosed at stages 1 and 2. The majority of patients in Australia and the Philippines had undergone breast surgery, and 88% of patients in Australia were not receiving treatment at the time of study participation.

Doctors' characteristics

Among doctors (n=86), 58% were medical oncologists, 15% breast surgeons and 27% general surgeons. 41% of doctors had more than 15 years' post-training experience

Protected by copyright, including managing eTNBC patients. 43% of doctors practised in ð academic-based institutions and 31% in private settings (table 2). uses related

DCE results

Overall patient and doctor preferences in treatment attributes

Preference weights for attributes estimated using the mixed-logit model (table 3) demonstrated that both 5 patients and doctors preferred longer DFS/EFS, a higher chance of achieving pCR and undergoing BCS after receiving anticancer treatment, lower risks of febrile neutropenia, peripheral sensory neuropathy, diarrhoea and irreversible endocrine-related side effects that require lifelong medication.

The analysis of relative importance score (figure 1) showed that attributes were rank ordered similarly between patients and doctors with pCR, DFS/EFS and risk of peripheral sensory neuropathy as the top three attributes and febrile neutropaenia as the lowest-rank attribute. Patients assigned more weight on safety attributes (46.8%) than doctors (27.7%), while doctors assigned more weight on efficacy attributes (72.3%) than similar technol patients (53.2%).

Patient preferences in treatment attributes by territory

Subgroup analysis revealed that patients in Australia, Korea, Japan and the Philippines placed greater weight on pCR than DFS/EFS and BCS, while patients in Taiwan had a relatively higher preference for BCS than pCR 3 and DFS/EFS (figure 2a). Among the safety attributes, patients in Australia, Japan, Korea and the Philippines placed greater weight on irreversible endocrine-related side effects that require lifelong medication, while patients in Taiwan placed higher importance on peripheral sensory neuropathy. The chance of pCR was the top-ranked attribute by patients in Korea, Japan and the Philippines; irreversible endocrine-related side effects in Australia; and peripheral sensory neuropathy in Taiwan.

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Table 3 Preferences among patients and doctors for selected attribute levels								
Attributes	Levels	Coefficient*	SE	P value	Coefficient*	SE	P value	
		Patient preferences (n=115)			Doctor preferences (n=86)			
DFS/EFS	12 months	-1.02	0.16	0.000	-3.87	0.53	0.000	
	18 months	-0.30	0.11	0.008	-0.42	0.22	0.054	
	24 months	0.53	0.14	0.000	1.67	0.27	0.000	
pCR	30% probability	-1.76	0.19	0.000	-4.00	0.56	0.000	
	50% probability	-0.74	0.11	0.000	-1.36	0.21	0.000	
	70% probability	1.07	0.13	0.000	1.71	0.22	0.000	
Chance of undergoing BCS after receiving anticancer treatment	30% chance	-0.48	0.12	0.000	-0.82	0.20	0.000	
	50% chance	-0.32	0.10	0.002	-0.96	0.23	0.000	
	70% chance	0.43	0.09	0.000	0.49	0.10	0.000	
Febrile neutropaenia	5% risk	0.27	0.08	0.001	0.02	0.10	0.873	
	10% risk	-0.35	0.11	0.001	0.00	0.22	0.984	
	20% risk	-0.55	0.12	0.000	-0.25	0.20	0.205	
Peripheral sensory neuropathy	5% risk	0.59	0.10	0.000	0.54	0.10	0.000	
	20% risk	-0.30	0.10	0.003	-0.80	0.22	0.000	
	40% risk	-0.93	0.16	0.000	-1.36	0.28	0.000	
Diarrhoea	10% risk	0.38	0.15	0.000	0.38	0.15	0.000	
	25% risk	-0.25	0.11	0.026	-0.50	0.21	0.016	
	50% risk	-0.47	0.10	0.000	-0.70	0.18	0.000	
Irreversible endocrine-related side effects requiring	0% chance	0.68	0.12	0.000	0.65	0.12	0.000	
lifelong medication	8% chance	-0.78	0.10	0.000	-0.93	0.19	0.000	

Note: Coefficients represent the change in utility for a respondent for a specific level of a given attribute. Positive coefficients indicate positive preference BCS, breast conserving surgery; DFS/EFS, disease-free survival/event-free survival; pCR, pathological complete response; SE, standard error.

Doctors' perspectives of treatment attributes by territory

Subgroup analysis revealed differences in treatment attribute preferences between doctors in various territories (figure 2b). Doctors in Australia, Korea and the Philippines placed greater weight on DFS/EFS than pCR, while those in Japan and Taiwan had a relatively higher preference for pCR than DFS/EFS. There were variations in the relative importance of safety attributes across the territories; the highest-ranking safety attributes were peripheral sensory neuropathy in Australia, Japan and

the Philippines, while irreversible endocrine-related side effects and diarrhoea were ranked higher in Korea and Taiwan, respectively.

Subgroup analysis results

Relative importance of treatment attributes in medical oncologists and surgeons

Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies. Medical oncologists and breast/general surgeons prioritised pCR and DFS/EFS as the top two attributes (online supplemental figure 2). Surgeons placed a higher



Figure 1 Relative importance of attributes in patients and doctors overall. BCS, breast-conserving surgery; DFS/EFS, diseasefree survival/event-free survival; pCR, pathological complete response.



Figure 2 Relative importance of attributes in (a) patients and (b) doctors in different territories. BCS, breast-conserving surgery; DFS/EFS, disease-free survival/event-free survival; pCR, pathological complete response.

importance on irreversible endocrine-related side effects than medical oncologists (rank 3 vs 6).

Relative importance of treatment attributes in patients by age group

Patients above the age of 50 placed a higher importance on irreversible endocrine side effects than younger patients did (online supplemental figure 3). pCR was the top-ranked attribute in both older and younger patients. The chance of undergoing BCS after treatment was the lowest ranked attribute in older patients, while febrile neutropaenia was the lowest rank attribute in younger patients.

Relative importance of treatment attributes in patients diagnosed at different stages

The top two attributes in patients diagnosed in Stage 1 were peripheral sensory neuropathy and pCR; for patients diagnosed in stages 2 and 3 were pCR and DFS/ EFS (online supplemental figure 4). The lowest ranked

attribute for patients diagnosed in stage 1 and stages 2 and 3 were diarrhoea and the chance of undergoing BCS, respectively. Patients diagnosed in stages 2 and 3 assigned more weight on efficacy than safety (55.9% vs 44.1%) attributes, while patients diagnosed in stage 1 assigned more weight on safety than efficacy (53.9% vs 46.1%) attributes.

Relative importance of treatment attributes in patients by the duration of time since diagnosis

We undertook an exploratory analysis to investigate if patient preferences in the treatment varied with the length of time since diagnosis. However, the relative importance of attributes was similar between patients who were diagnosed with eTNBC within or more than 2 years prior to study participation (online supplemental figure 5). There was a greater difference in the relative importance score for irreversible endocrine-related side effects for patients diagnosed more than 2 years prior to study participation than for patients within 2 years of their diagnosis (17.4% vs 12.0%, rank 2 vs 4).

Relative importance of treatment attributes in patients who were receiving chemotherapy during study participation

As treatment preferences may be influenced by patients' experience with various types of treatment, we undertook an exploratory analysis in attribute preference based on the treatment received during study participation. pCR was the top rank attribute in patients who were receiving chemotherapy and non-chemotherapy options (surgery, radiation therapy, no treatment) during study participation (online supplemental figure 6). The second most important attribute was DFS/EFS in the non-chemotherapy subgroup and peripheral sensory neurop-athy in the chemotherapy subgroup.

DISCUSSION

Treatment regimens for eTNBC are associated with different efficacy-tolerability profiles; however, there is limited information on how patients and doctors perceive various treatment characteristics. This study characterised treatment attributes important to patients and doctors in five territories in Asia–Pacific and assessed the alignment in patient preferences and doctors' judgement.

While there were differences in preferences for treatment attributes between patients diagnosed at stage 1 compared with stages 2 and 3, our study found that the overall ranking of treatment attributes was similar between eTNBC patients and doctors, where doctors and patients ranked efficacy attributes pCR and DFS as the top two attributes. While the median age of patients in our study is consistent with the reported peak age of diagnosis of TNBC in Asia,³ the high literacy rate among the patient population in our study could have contributed to a more consistent understanding of treatment outcomes between patients and doctors. Nevertheless, patients tended to place greater importance on the safety attributes tested compared with doctors, indicating differences in how patients perceive the impact and value of treatment side effects. This is consistent with qualitative studies that reported the complex decision-making processes encountered by patients when evaluating treatment options, with choices shaped by factors including quality of life, capacity to maintain daily routines, ability to meet work and home responsibilities.¹⁹ Furthermore, patients expressed a keen desire to be actively involved in decision-making with their physicians to choose treatments that align with their goals.^{19 20} The findings of our study thus suggest a need for physician and patient education in communicating and helping patients better understand complex treatment characteristics and outcomes, to ensure goal concordance between patients and doctors.

While patients in our study prioritised pCR, a DCE study investigating patients' preferences for metastatic breast cancer treatment found that overall survival was of primary importance.⁸ The importance of pCR to patients

in our study may be due to the majority of patients being in the early phases of their treatment, as indicated by the high proportions diagnosed within 2 years of study participation and receiving chemotherapy. This preference is consistent with a survey of early-stage breast cancer patients that also found that the achievement of pCR was most important, ahead of DFS and option for BCS.²¹ In addition to the high literacy rate, the importance of pCR might be reflective of the discussions patients had with their doctors during the decision-making process for neoadjuvant therapy, where patients were informed of the relevance of pCR as an interim surrogate marker, which correlates with long-term survival outcomes.

Among the territories, the majority of patients in Japan, Korea and the Philippines had a more recent 8 diagnosis of eTNBC and were receiving chemotherapy at the time of the survey, which may account for the importance of pCR to patients in these territories. The prioritisation of peripheral sensory neuropathy and irreversible endocrine-related side effects by patients in Taiwan and Australia, respectively, may be attributed to differences in literacy and age. Additionally, the presence of patient support groups in Taiwan may also have use contributed to the high level of patient education and awareness of side effects. Subgroup analysis by age also showed that compared with older patients, younger patients placed greater importance on peripheral sensory neuropathy than they did irreversible endocrine-related side effects, suggesting that younger patients might be ē better informed of management options for irreversible endocrine-related side effects.²² The relatively higher preference for BCS by patients in Taiwan could be due to younger age compared with patients in other territories.²³ Inherent limited access to health facilities may also \blacksquare account for the low relative importance of BCS to patients in the Philippines, where the rates of BCS and adjuvant radiotherapy use have been reported at less than 11% ≥ and 51% at tertiary institutes, respectively.²⁴⁻²⁶

Interestingly, we found that patients diagnosed in **pg**, stages 2 and 3 prioritised pCR, while peripheral sensory **g**, neuropathy was the top attribute for patients diagnosed in stage 1, indicating patients' awareness of the higher probability of survival in stage 1 and thus prioritised side effects, while patients in later stages had a poorer prognosis and prioritised treatment efficacy.

nosis and prioritised treatment efficacy. Despite the increasing use of neoadjuvant chemotherapy for eTNBC in the region as recommended by various treatment guidelines, ^{6 27 28} there were slight differences in efficacy outcomes prioritised by doctors across the territories. While survival was ultimately prioritised by doctors in Australia, Korea and the Philippines, the achievement of pCR was deemed the immediate goal in Japan and Taiwan. The achievement of a pCR after neoadjuvant chemotherapy is regarded as a marker for systemic therapy sensitivity.⁴⁶ There has been an accumulation of evidence demonstrating that pCR is associated with improved long-term outcomes in EFS and overall survival for TNBC.^{29 30} Indeed, the overall importance of pCR to doctors in our study reflects its increasing recognition as a clinically relevant outcome. Interestingly, surgeons placed greater emphasis on irreversible endocrine-related side effects than medical oncologists did. This suggests a possible divergence in understanding and management approaches between the two specialties, further highlighting the need for multidisciplinary management of patients to continue beyond early stages of treatment.

The findings of our study should be interpreted within the following limitations. Since patients were referred by treating doctors, patient advocacy groups and were members of consumer panels, they are likely to be more engaged and informed, which could contribute to the alignment in ranking of attributes between patients and doctors in our study. Furthermore, patients included in our study had a high literacy rate; thus, results may not be representative of patients with lower health literacy. The recruitment of patients was also based on self-report of clinician-confirmed diagnosis of eTNBC and was not verified through medical records. There was also variability in patient characteristics across the territories leading to variability in experience and understanding of treatment attributes. Patients who were diagnosed with stage 1 disease would not have been eligible for immunotherapy and thus may not fully comprehend the impact of irreversible endocrine-related side effects. These patients also typically proceed to surgery directly and are thus deemed to achieve pathological complete response as a hypothetical attribute. Our study included participants from five different territories, thus encompassing diverse cultural, social and economic contexts present in the Asia-Pacific region and enabled evaluation of differences in preferences for eTNBC treatment attributes among these territories. Although there was a relatively small sample size of participants from each territory, the overall sample size was deemed sufficient for analysis of each participant group. The findings of our study provide a foundation for validation in a larger cohort, which would allow for exploration of differences in treatment attribute preferences among patients diagnosed with different stages of eTNBC or with different sociodemographic characteristics. While the overall median age of eTNBC patients in our study is consistent with published data,³ patients in Taiwan were comparatively younger, which could imply a difference in treatment experience and perceptions. Nonetheless, our study used a multi-step process to identify attributes and levels, which involved a thorough literature review, discussions with expert doctors (co-authors) involved in management of patients with eTNBC and cognitive interviews with eTNBC patients and doctors to ensure the content validity and improvement of the DCE questionnaire. The use of the same attributes in patients' and doctors' DCE also enabled comparison of their perspectives.

CONCLUSION

It is well-accepted that shared clinical decision-making between patients and treating doctors is associated with

enhanced patient outcomes.²⁰ While there was concordance between patients and doctors in the ranking of the seven assessed treatment attributes, patients generally assigned more emphasis on safety-related attributes than doctors did. To our knowledge, this is the first study that quantifies patient and doctor preferences for eTNBC treatment in Asia. Understanding patient perspectives would also help guide doctors in explaining complex treatment characteristics in the limited time available during consultation. With the shift towards including patient perspectives in assessing the value of treatments, our study provides insights on the alignment between patients' and doctors' preferences for eTNBC treatment, which may enhance medical decision-making and evaluation of treatment for reimbursement.

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Acknowledgements The authors would also like to thank Miss Roh Hyun from MSD, Miss Au Sook Yin and Miss Nontakan Sricharoen from IQVIA for managing this project. The IQVIA Primary Intelligence Asia–Pacific team was responsible for collecting data.

Contributors All authors were involved in the conception and design of the study, interpretation of results and critical revision of the manuscript. QS and TEM were involved in data analysis and drafting the manuscript. All authors read and approved the final manuscript. AY is responsible for the overall content as guarantor.

Funding This work was supported by funding from MSD International GmbH, Singapore Branch

Competing interests AY received consulting fees from GSK, MSD, Eisai; received honoraria from MSD, Eisai, AstraZeneca and GSK; received support from MSD for attending meetings and/or travel; and has a leadership role in Australia New Zealand Gynaecological Oncology Group. JKH received consulting fees from AstraZeneca, Celgene, Everest Medicine, MSD, Pizer, Takeda Pharmaceuticals, Bixink Therapeutics, Daiichi Sankyo, Gilead, Novartis, Roche. SC received honoraria from Chugai, AstraZeneca, Eisai, Kyowa-Kirin and MSD; received consulting fees from Daiichi-Sankyo; and has a leadership role in the Adolescent and Young Adult Cancer Alliance. LJI, TML received honoraria from MSD. ISY, SC and HDC were full-time employees of MSD. QS and TEM were full-time employees of IQVIA that was commissioned to conduct this study. The funding source had no role in the analysis of this study. All other authors have no competing interests to declare.

Patient and public involvement Patients and/or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Bellberry Human Research Ethics Committee (2021-12-1415), National Center for Global Health and Medicine Institutional Review Board (IRB) (NCGB-S-004437-00), Asan Medical Center IRB (2022-0098), Cardinal Santos Medical Center Research Ethics Review Committee (2021-052) and Taipei Veterans General Hospital IRB

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(2022-08-023AC). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

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