

# Validity and Reliability of Malay Language Breast Cancer Awareness Scale for Male-to-Female Transgender

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## ABSTRACT

**INTRODUCTION:** Risks of breast cancer occurring among female transgender using hormonal therapy is emerging. However, most transgenders are also engaged in breast implant procedures resembling female sexual characteristics and satisfaction without realizing the risk of cancer development. Thus, breast cancer risk assessment of female transgenders in Malaysia should be evaluated further. This study aims to develop and validate an assessment tool in the Malay language version to measure breast cancer awareness among female transgenders in Malaysia. **MATERIALS AND METHODS:** A cross-sectional study with a purposive sampling method was conducted among 300 respondents in districts in the states of Pahang, Kedah, and Kelantan. The minimum number of respondents required was 300 persons based on the Nunnally method, with an item ratio of 1:10. All the subjects were given questionnaires on sociodemographic data and breast cancer-related items, consisting of five domains; knowledge of symptoms and clinical features, breast cancer risk factors, breast screening programmes, barriers in seeking medical help, and lastly, the confidence, skills and behaviour concerning breast self-examination. Each domain consisted of five to seven items. All the responses were recorded as 'Yes,' 'No,' or 'Not Sure'. Reliability was determined using Cronbach's alpha for internal consistency, while construct validity was assessed using exploratory factor analysis. **RESULTS:** The reliability of the 28 items for Malay Version of Breast Cancer Awareness scale by Cronbach Alpha was 0.864, suggesting that the constructs were reliable and acceptable. In addition, the construct validity was assessed using exploratory factor analysis highlights five meaningful domain. **DISCUSSION AND CONCLUSION:** This Malay language breast cancer awareness scale is a convenient self-assessment method, inexpensive and understandable which highlights common issues faced by male-to-female transgender with targeted domains. This scale is valid and reliable by achievable internal consistency value of 0.864.

## Keywords

transgender, hormonal therapy, breast cancer, breast implant

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Received: 5<sup>th</sup> July 2022; Accepted: 26<sup>th</sup> Oct 2022

Doi: <https://doi.org/10.31436/imjm.v21i4>

## INTRODUCTION

Transgenders commonly undergo cross-sex hormone therapy to satisfy their secondary female characteristics.<sup>1</sup>

Transgenders may be identified as heterosexual, homosexual, bisexual, or none of the above. They can further be divided into a male-to-female transgenders (transgender women) assigned males at birth but who are identified as women and want to use oestrogens with or without an anti-androgen to develop female secondary sex characteristics. Meanwhile, female-to-male transgenders (transgender men) are persons assigned as females at birth but who identify themselves as men and want to use

testosterone to develop male sexual characteristics.<sup>2-4</sup>

Worldwide, the estimated prevalence of the transgender population is around 0.3-0.5%.<sup>4,5,7</sup> Activists have estimated that there are around 100,000 transsexuals in Malaysia. The number of transsexuals in the capital city Kuala Lumpur alone is estimated to be 50,000. This estimation indicates that more than one out of every 200 individuals in Malaysia is a transsexual.<sup>6</sup> However, the numbers may be underreported due to discrimination and social stigmatization. Gender minority is meant to be an

inclusive umbrella term that includes people who identify as transgender or have other genders.<sup>4</sup>

Breast augmentation is a commonly opted procedure by a male-to-female transgender as the transition process for an immediate effect to resemble secondary female sexual characteristics.<sup>7,8</sup> Breast augmentation rate procedures are reported up to 67% in the male-to-female transgender population.<sup>8,11</sup> Some prefer silicone filler injection over implant insertion due to cheaper costs.<sup>9</sup> However, breast implant usage may interfere with the routine mammography to detect any lump that may delay the treatment. Therefore, those with breast augmentation may be more likely to be diagnosed with advanced disease.<sup>10</sup> Nevertheless, the risk and complications of breast implant insertion are poorly understood, especially among this marginalized community in Malaysia due to lack of awareness.<sup>7</sup> Peer influence and the job scope as sex workers are reasons why breast implant surgery is mainly done as the requirement to be a male-to-female transgender.<sup>11</sup> Hence, they value the importance of the breast implant despite knowing the cancer risks involved.<sup>11</sup> Multiple complications related to breast implants should be emphasized as primary prevention for transgender population as implant carries risk outweighs the benefits.<sup>12, 13</sup>

The usage of prolonged sex steroids results in adverse effects like acne, venous thromboembolism, atherosclerosis, hypertension, hyperlipidaemia, prostate hyperplasia and can exacerbate cancer risk for prostate, breast, and ovaries.<sup>14</sup> The oral form sex steroids contain lesser oestrogen dose than the injection type. Hence, injectable oestrogens are preferred by the transgender population because of the high circulating oestrogens even though they carry overdose risks.<sup>15,16</sup> The role of contraceptive pills in the incidence of breast cancers has been addressed in various studies and is associated with an increased risk of developing breast cancer.<sup>17</sup> In Malaysia, there is no advocacy for the safety of hormonal therapy among the transgender population since this is sensitive and LGBT issues are still not well accepted due to Islamic laws. However, this minority group should be informed of the risk factors of hormonal therapy as they

are also predisposed to breast cancer risk due to prolonged hormone usage.<sup>18,20</sup> Even though more cases of cardiovascular diseases as complications of prolonged use of hormonal therapy without supervision have been noted, the relative risk of increasing hormone-related breast cancer among male-to-female transgender should be addressed.<sup>11,19,23</sup>

As the majority of breast cancer screening tools and scale mainly focus on women<sup>22,23</sup> hence the study objective is mainly to developed a new breast cancer awareness scale for male-to-female transgender population as a screening tool which comprises of knowledge of breast cancer risk and complications, medical barriers, confidence ,skills and behaviour in relation to breast self-examination and knowledge of breast screening programmes available. Adopting the Breast Cancer Awareness Measure (BCAM)<sup>22</sup>, some modification was made to tailor with the profile and general features of male-to-female transgender population which will further be elaborated in the discussion. The BCAM was chosen because the questionnaires have been translated and validated in Malay; Breast Cancer Awareness Measurement- Malay (BCAM-M) as which is related to our newly developed questionnaire which also used Malay language.<sup>22</sup>

The male-to-female transgender population should be made aware of their breast cancer risk resulting from iatrogenic hormonal factor and breast implant insertion as few case reports have been reported regarding the number of breast cancers among male-to-female transgender.<sup>24,28-30</sup> One of the cancer types is the breast implant-associated anaplastic large cell lymphoma which occurs in the periprosthetic fluid or the implant capsule.<sup>28,30-32</sup> Exogenous hormones are known to play a role in breast and reproductive oncology, as in the case of hormone replacement therapy (HRT) and increased breast cancer risk.<sup>29,23</sup>

In addition, the health equity for the transgender population should be upheld as they encounter cancer disparities due to their gender-biased and the social stigmatization in which their community was hidden among the average population.<sup>20,21,30</sup> The campaign for

cancer awareness among them is minimal; thus lacking knowledge regarding the risk of cancer-predisposing them to disease mortality and morbidity.<sup>22-24,27,32</sup> Since most of them are involved in sex reassignment surgery and excessive hormonal usage, a comprehensive, easy-to-use assessment tool is required to create awareness on breast cancer for a better screening method and early detection to save lives and prevent mortality. The term Situation Awareness (SA) suits the concept, as it refers to a personal understanding of the situation around them and the reaction performance to overcome it.<sup>25,26</sup> It applies to the health care system as well. In this context, our study applies to the situational awareness concept regarding breast cancer awareness among male-to-female transgender by assessing their knowledge of breast cancer, such as risks concerning hormonal therapy and breast implant complications that are causing cancer and actions to overcome it.<sup>37,38</sup> As transgenders often seek less professional medical advice as evidenced by National Transgender Discrimination Survey Report on Health Care, survey participants reported very high levels of postponing medical care when sick due to discrimination or inability to afford the treatment cost.<sup>5,45</sup>

Hence, a validated, self-administered and easily understandable breast cancer awareness screening tool should be developed and being used among primary care physician especially for screening purpose among male-to-female transgender community for breast cancer risk and complication. Early detection will save lives and may expedite earlier intervention when indicated.<sup>30</sup> The questionnaire itself should avoid any bias and stigmatization matters in relation with the transgender health context issue since stigma is a personal quality or condition that the majority population consider being deviant or, in some way, diminishes the person's status or worth.<sup>44</sup> As for this transgender population, once the stigmatization barrier is removed, more transgenders will come for medical attention which will then further improve their health status as an overall, and not merely related to breast cancer.<sup>30</sup> Opportunistic health screening related to HIV, sexual transmitted disease, cardiovascular health, mental health can be promoted during the medical visit, hence optimizing their health status as a whole.<sup>30</sup>

## **METHODOLOGY**

In our study, the respondents were all Malays who were recruited from districts of Kuantan (Pahang), Kota Bharu (Kelantan) and Langkawi (Kedah).

## **ITEM DEVELOPMENT**

The initial steps for item development were identifying the problem in which referring to lack of breast cancer awareness screening tool for male-to-female transgender population. The next step then was the literature review and brain storming by the experts and specialists involved in the study. For reference, the Malay translated version of Breast Cancer Awareness Measurement (BCAM-M) was used as it was already translated to Malay and validated. As for content validity, several revisions after literature review and brainstorming sessions were done among the team members which involved the opinions from six panels (two Family Medicine Specialist, one transgender expert, two breast surgeon, one plastic surgeon).

The questionnaire consists of 2 sections. Section A comprises a set of questions regarding the sociodemographic data, including age, marital status, occupational, income, hormonal type and status, history of breast implant, or any sex reassignment surgery procedure of the participants. In section B, the questionnaire was organized into five domains: knowledge of symptoms and clinical features, knowledge of risk factors for breast cancer, breast screening programmes, barriers in seeking medical help, and confidence, skills, and behaviour concerning breast self-examination. Each domain consists of five to seven items. All the responses to questions are recorded as either Yes, No, Not Sure. After team discussion, 31 items were identified suitable for developing the questionnaire, which was grouped into the five domains accordingly.

## **SCALE DEVELOPMENT**

Face validity was carried out among non-respondent participants for this research. Ten male-to-female

transgender were recruited to answer the questionnaires. Based on their feedback, several revisions and corrections were made in order to create an understandable, self-administered questionnaire. After the set of items was finalised, the questionnaires was distributed to the 300 respondents, based on requirement needed based on the inclusion and exclusion criterias. Regarding the questionnaire development, five domains were proposed and identified. Each domain will carry five items each. The total of items by using the Nunally method was estimated at 250 respondents. By including about 20% extra, the total respondents will be about 300. According to Keyser-Meyer-Olkin, a value of more than 0.7 and significant Bartlett's test of sphericity ( $P$ -value $<0.001$ ) is needed in providing significant components in the factor analysis (adequacy of sample size and data).

This cross-sectional study was carried out in Kuantan, the district capital of Pahang, Malaysia. The Kuantan area was chosen because the location was convenient for the researcher to run the study and for logistic reasons. The respondents were recruited from well known areas in Kuantan. The locals appeared and gathered most frequently at Jalan Gambut, Jalan Pasar Baru, Jalan Dato Wong Ah Jang, and Jalan Mat Kilau. The respondents also were also identified and recruited from "Persatuan Insaf Pahang," a non-governmental organization based in Kuantan that focuses on the unique needs of "Maknyah" (male-to-female transgender). Persatuan Insaf Pahang was established by a Family Medicine specialist in 2013 is runned by doctors, religious teachers, and transgender members since then. Its members consisted of Muslim and non-Muslim transgenders from all backgrounds and age groups. At the start of the study the respondents were informed that their participation in the study was completely voluntary and that they could withdraw their consent to participate at any time without the need for explanation. They were also informed that their decision to participate or withdrawal of consent would not in any way change their treatment. Oral and written informed consent was obtained from all subjects. The research was conducted from October 2020 till December 2021. The inclusion criteria were male-to-

female transgender aged 18 years and above. The exclusion criteria were illiterate respondents and withdrawal subjects. This research applied the purposive sampling method to identify the respondents as it is cost-effective and more focused on the targeted population. The sample size validation was calculated by a subject-to-variable ratio of 1:10 according to the Nunnally method.<sup>46</sup>

## SCALE EVALUATION

After the survey administration was done, the results were analysed accordingly by extraction factor analysis (EFA). EFA is essential to determine any redundancy in a set of measures and testing a factor structure that has been hypothesised. Using the principal component extraction method, EFA was performed on each subset of the data. The Principal Component Analysis (PCA) with varimax rotation method was utilised to extract factors as recommended by Gaskin and Happell (2014)<sup>35</sup> since this method calculates factor based on the correlation among the items. Furthermore, PCA was suggested to be used when no prior theoretical basis or model exists.<sup>36</sup> To examine the appropriateness of the data for factor analysis, the results were centred on the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity.

The Kaiser-Myer-Olkin (KMO) and Bartlett's Test of Sphericity were tested to measure sampling adequacy. Meanwhile, internal consistency described the degree to which all items in a questionnaire measured the same concept or construct, and hence it is connected to the inter-relatedness of the items within the test.<sup>37</sup> The most popular method employed for assessing internal consistency reliability is Cronbach's alpha test.<sup>38</sup> The coefficient of internal consistency gives an estimate of the reliability of measurement and is constructed on the belief that items determining the same construct ought to correlate. Analysis was conducted using IBM SPSS Statistics (Version 26.0). The robust statistical software platform, IBM SPSS 26.0, offers statistical techniques to ensure high accuracy and superior decision-making.

## RESULTS

The descriptive statistics for the sociodemographic variables of the respondents is presented in Table 1. According to the marital status, out of 300 respondents, 284 (94.7%) are single, 4 (1.3%) of them were married, 5 (1.7%) were divorced, and 7 (2.3%) of them were cohabiting. On average, the respondents have two dependents. Regarding educational levels, half of them had finished Form 5, 154 (51.3%), 12 (4.0%) had no educational background, 20 (6.7%) had not finished elementary school, 36 (12.0%) respondents finished elementary school, 31 (10.3%) are Sijil ('O' level certificate) holder, 35 (11.7%) are A-Level/STPM/HSC/Diploma holder, and the rest 12 (4.0%) were had Bachelors Degree/Masters Degree/PhD. Furthermore, 179 (59.7%) of the respondents were self-employed, 12 (4.0%) government servants, 66 (22.0%) private-sector workers, 3 (1.0%) government pensioner and 9 (3.0%) private retirees. From the total of 300 respondents, 3 (1.0%) are part-time students, 3 (1.0%) were students, and 25 (8.3%) of them jobless. This study involved 282 (94.0%) from the B40 income category, accounting for the majority group. Meanwhile, the minority group, M40, and T20, respondents were 4.0% and 2.0%, respectively.

A total of 212 (70.7%) respondents used hormone. Of these 132 (62.3%) consumed pill type of hormone, 8 (3.8%) were using injection type, 67 (31.6%) a were using both types, while the rest 5 (2.4%) respondents were using another type of hormone such as a gel. Most of them were taking hormone between 1 to 10 years, 155 (73.1%), 43 (20.3%) around 11 to 20 years, 5 (2.4%) with more than 20 years. In addition, on average, those using hormones took the hormones once daily and 2.1 times a week. This study revealed a total of 66 (22.0%) respondents were using breast implants/fillers. Accordingly, 46 (69.7%) were using silicone implants, 3 (4.5%) using saline implants, 8 (12.1%) using silicone injection, 4 (6.1%) did not know the type of implants, and 5 (7.6%) did not know the type of injection. In this

study, it was observed that 20 (6.7%) respondents had diabetes, 8 (2.6%) had heart disease, 34 (11.3%) had high blood pressure, and 29 (9.7%) suffered from other diseases like asthma, high cholesterol, gastritis, GEPD, gout, HIV, haemorrhoids, low blood pressure hyperhidrosis, RVD, syphilis, stroke, and depression. Of the 300 respondents, 152 (50.7%) were smoking, and only 5 (1.7%) had undergone sex reassignment surgery.

**Table 1.** Sociodemographic Background (Part A)

Variables	Frequency (%) (n=300)
<b>Marital Status</b>	
Single	284 (94.7)
Married	4 (1.3)
Divorced	5 (1.7)
Cohabit	7 (2.3)
<b>Number of dependents</b>	2 (1.93)*
<b>Educational Level</b>	
No educational background	12 (4.0)
Not finish elementary school	20 (6.7)
Finished elementary school	36 (12.0)
Finished Form 5	154 (51.3)
Sijil	31 (10.3)
A-Level/STPM/HSC/ Diploma	35 (11.7)
Bachelor's Degree/Master's Degree/PhD	12 (4.0)
<b>Work Status</b>	
Government servant	12 (4.0)
Private sector worker	66 (22.0)
Self-employed	179 (59.7)
Government pensioner	3 (1.0)
Private retirees	9 (3.0)
Part-time student	3 (1.0)
Student	3 (1.0)
Jobless	25 (8.3)
<b>Total household income (monthly)</b>	
B40: <RM 4850	282 (94.0)
M40: > RM 4850 - RM 10,959	12 (4.0)
T20: > RM 10,959	6 (2.0)
Yes	212 (70.7)
No	88 (29.3)
<b>Type of hormone</b>	
Pill	132 (62.3)
Injection	8 (3.8)
Pill and Injection	67 (31.6)
Others (gel)	5 (2.4)
<b>Period of practice hormone intake</b>	
1-2 days	1 (0.5)
1 week	1 (0.5)
1-10 months	7 (3.3)
1-10 years	155 (73.1)
11-20 years	43 (20.3)
>20 years	5 (2.4)
<b>Frequency of hormone intake (daily)</b>	1 (0.76)*
<b>Frequency of hormone intake (weekly)</b>	2.1 (3.58)*

Variables	Frequency (%) (n=300)
<b>Breast implants/fillers</b>	
Yes	66 (22.0)
No	234 (78.0)
<b>Type of implants/injection</b>	
Silicone implants	46 (69.7)
Saline implants	3 (4.5)
Silicone Injection	8 (12.1)
Don't know the type of implants	4 (6.1)
Don't know the type of injection	5 (7.6)
<b>Diseases/illness</b>	
Diabetes	20 (6.7)
Heart disease	8 (2.6)
High blood pressure	34 (11.3)
Others	29 (9.7)
Not stated	209 (69.7)
<b>Smoking</b>	
Yes	152 (50.7)
No	148 (49.3)
<b>Sex Reassignment Surgery</b>	
Yes (L to P, full surgery)	5 (1.7)
No	295 (98.3)

\*Mean(SD)

^(asthma, high cholesterol, gastritis, GEPD, gout, HIV, haemorrhoids, low blood pressure, hyperhidrosis, RVD, syphilis, stroke, depression)

All 31 items in the questionnaire (Part B) were examined using EFA as suggested with the objectives: to determine the structure between the constructs, detect and assess the one-dimensionality of the theoretical constructs, and reduce the number of variables. In addition, factor analysis aimed to reveal any latent variables that caused the manifest variables to covary. It was decided that EFA was the best method to adopt for a thorough investigation of the items used to measure the validity of the Malay Version Breast Cancer Awareness Scale for male-to-female transgender. The data comprised of 300 respondents subjected to the exploratory factor analysis (EFA) and reliability analysis. The results of exploratory factor analysis (EFA) and the reliability analysis of the ten constructs is discussed in the following sections.

## DATA ANALYSIS

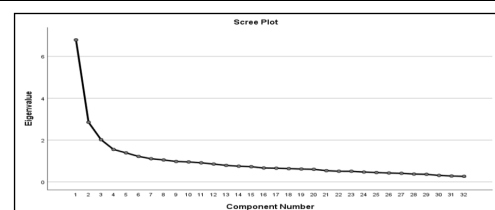
The questions in Part B were gauged using 31 items in the survey, using the score 1–Yes, 0–No, and 0–Unsure. There is no cut off point for marks as these will be collected as total marks and summarised as continuous data in order to review the general ideas and knowledge of male-to-female transgender community, particularly first pilot study in the Kuantan area. The results to verify that the pilot data of n=300 was suitable for factor analysis is

disclosed in Table 2. The Kaiser-Meyer-Olkin Measure (KMO) value after deletion of three items (item B26, B29, and B30) with low factor loading and redundancy was 0.84; this value is higher than the threshold value of 0.6.46. The Bartlett's Test of Sphericity was also significant (Chi-square = 2356.57, P-value < 0.000). Certainly, when the KMO value is close to 1.0, and the significance value of Bartlett's Test of Sphericity is close to 0.0, it can be concluded that the questionnaire with 28 items was adequate to proceed with Factor Analysis (FA). Several factors needed to be considered when items needed to be dropped, for example, redundancy, expert agreements, or problematic items like unclear questions. As for this case, items B26, B29, and B30 were removed due to similar meanings and thus redundant. Items with unsatisfactory and very poor factor loadings ( $\leq 0.3$ ) can be considered for removal.<sup>46</sup>

Table 2 shows the PCA with varimax rotation result for the 28 items for the questionnaire. The results revealed that the PCA procedure had extracted five distinct dimensions with eigenvalue exceeding the value of 1.0. The total variance explained for all five dimensions to be 50.00% achieved the minimum percentage of acceptable variance explained in factor analysis for a construct to be valid. Explicitly, the five dimensions explained a total of 50.00% of the variance, with Dimension 1 contributing 22.21%, Dimension 2 contributing 9.59%, Dimension 3 contributing 6.57%, Dimension 4 contributing 5.26%, and Dimension 5 contributing 4.31%.

**Table 2.** Extraction Method: Principal Component Analysis

		Total Variance Explained								
		Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
C	1	6.22	22.21	22.21	6.22	22.21	22.21	4.32	15.43	15.43
O	2	2.69	9.59	31.80	2.69	9.59	31.80	3.46	12.37	27.80
M	3	1.84	6.57	38.37	1.84	6.57	38.37	2.31	8.25	36.05
P	4	1.47	5.26	43.63	1.47	5.26	43.63	2.07	7.38	43.43
O	5	1.21	4.31	47.94	1.21	4.31	50.00	1.26	4.51	50.00



**Figure 1.** Screen Plot

Next, corresponding to the rotated component matrix results for the questionnaires, all 28 items (after deletion of

items B26, B29, and B30) were divided into five dimensions. Each item has a factor loading of more than 0.4. The items fall according to their dimensions. Dimension 1 consists of 9 items, Dimension 2 consists of 9 items, Dimension 3 consists of 4 items, Dimension 4 consists of 3 items, and Dimension 5 consists of 3 items. The reliability analysis for the constructs for this pilot study is presented in Table 3.

**Table 3.** Rotated Component Matrix (Part B)

Dimension	Item Label	Item Statement	Dimensions				
			1	2	3	4	5
1	B12	Rasa sakit pada bahagian payudara dan ketiak merupakan salah satu tanda kanser.	.71				
	B17	Kemunculan ketulan baru pada ketiak merupakan salah satu tanda kanser payudara.	.71				
	B14	Keadah puting payudara yang tertarik ke dalam merupakan tanda kanser payudara.	.70				
	B15	Perubahan saiz dan bentuk yang tidak sama antara kedua-dua belah payudara merupakan tanda kanser payudara.	.69				
	B16	Sebarang perubahan pada kulit payudara dan keruping di puting payudara merupakan salah satu tanda kanser payudara.	.69				
	B13	Lelehan seperti darah, nanah atau cecair yang keluar daripada puting payudara merupakan salah satu tanda kanser payudara.	.65				
	B11	Kemunculan ketulan baru pada payudara merupakan salah satu tanda kanser payudara.	.63				
	B18	Pemeriksaan sendiri payudara boleh mengesan perubahan yang tidak normal pada payudara dengan lebih awal.	.55				
	B19	Adakah anda mengetahui cara-cara melakukan pemeriksaan sendiri pada payudara anda? Penggunaan terapi hormon estrogen atau progesteron sama ada pil, suntikan atau tampalan dalam jangka masa yang lama boleh meningkatkan risiko mendapat kanser payudara.	.47				
2	B6	Penggunaan terapi hormon estrogen atau progesteron secara pil, suntikan atau tampalan secara berlebihan daripada dos yang dibenarkan boleh meningkatkan risiko mendapat kanser payudara.		.66			
	B3	Pengambilan alkohol berlebihan akan meningkatkan risiko mendapat kanser payudara.		.64			
	B7	Obesiti (kegemukan) akan meningkatkan risiko mendapat kanser payudara.		.61			
	B5	Masalah kecacatan genetik akan meningkatkan risiko kanser payudara.		.60			
	B8	Kegagalan fungsi atau penyakit berkaitan hati adalah salah satu faktor risiko kanser payudara.		.60			
	B9	Pemeriksaan sendiri payudara bagi pengguna terapi hormon estrogen atau progesteron sama ada menggunakan pil, tampalan atau suntikan perlu dilakukan dengan lebih kerap iaitu sebulan sekali.		.59			
	B21	Tidak aktif melakukan aktiviti fizikal (seperti bersukan, beriadah, bersenam) akan meningkatkan risiko mendapat kanser payudara.		.56			
	B4	Pembedahan membuang buah zakar/kemaluan adalah salah satu faktor risiko mendapat kanser payudara.		.46			
	B10	Adakah anda berasa tidak selesa untuk bercerita tentang masalah payudara kepada doktor anda? Adakah anda berasa tidak selesa jika payudara anda dipenksa oleh doktor?		.44			
3	B28				0.77		
	B24						

	B27	Anda tidak selesa dengan penampilan diri sekiranya perlu ke klinik atau hospital untuk mendapatkan rawatan.					-0.76
	B23	Adakah anda risau tentang kos rawatan?					0.65
4	B22	Sekiranya anda mendapati ketulan pada payudara ketika pemeriksaan sendiri, adakah anda akan terus berjumpa doktor untuk mendapatkan rawatan?					.59
	B33	Sekiranya didapati ketulan pada payudara disahkan kanser, adakah anda bersetuju untuk menjalani rawatan yang sepatutnya?					.58
	B2	Sejarah kanser payudara dalam kalangan ahli keluarga terdekat (ibu bapa, adik-beradik, anak) akan meningkatkan tahap risiko seseorang untuk mendapatkan kanser payudara.					.47
5	B1	Hanya golongan wanita sahaja berisiko untuk mendapatkan kanser payudara.					-.65
	B31	Kaedah pemeriksaan mammogram boleh digunakan untuk membuat diagnosis kanser payudara dengan tepat.					.45
	B32	Pada pendapat anda, pemakaian implant payudara akan mengganggu proses rawatan kanser payudara.					.47

## RELIABILITY STATISTICS

In general, the value of the reliability of the 28 items in Part B was 0.86, with 95% CI (0.16, 0.22) achieving the minimum threshold of 0.70, hence the items representing the constructs were reliable and acceptable. The reliability statistics for Dimension 1, Dimension 2 and Dimension 3 were 0.86 with 95% CI (0.36, 0.45), 0.78 with 95% CI (0.24, 0.33) and 0.70 with 95% CI (0.31, 0.43), respectively. These values achieved the minimum threshold of 0.70, indicating that the items representing the constructs were reliable and acceptable. However, Cronbach's alpha values for Dimension 4 and Dimension 5 were 0.42 with 95% CI (0.12, 0.27) and 0.26 with 95% CI (0.04, 0.18), respectively, demonstrating that the items representing the constructs are unreliable and acceptable since the values did not achieve the required values of 0.70. Accordingly, Table 4 shows improving the reliability of the affected Dimensions. Based on our results, Cronbach's alpha values will increase to 0.51 with 95% CI (0.24, 0.44) if item B2 was removed from Dimension 4, and Cronbach's alpha value will increase to 0.48 with CI 95% (0.21, 0.41) after removing item B1. These values, however, still did not achieve the minimum requirement for the items representing the constructs to be reliable (< 0.70).

**Table 4.** Reliability Statistics for Dimension 4 and 5 Items

Items	Cronbach's Alpha if Item Deleted
B22	.31
B33	.14
B2	.51
B1	.50
B31	-.08
B32	-.03

## DISCUSSION

To the best of our knowledge, this is the first study regarding the development and validation of breast cancer awareness scale for male-to-female transgender population. The Malay language was used because it is the national language, and most transgenders used it as their first language in Malaysia.

According to the sociodemographic analysis, more than half of the respondents (70.7%) used hormone therapy, and 22% of the total respondents used breast implants or fillers. By addressing the higher numbers of transgenders using of hormonal therapy and breast implants, this study can significantly impact the transgender population to stratify them into the high-risk group of people at risk of breast cancer. Majority of breast cancer awareness scales target the female population.<sup>49,50</sup> Our newly developed breast cancer awareness scale is more transgender-friendly, easily understandable, and primarily occupies all the common issues which male-to-female transgender population encounters. This questionnaire was adapted from Breast Cancer Awareness Measurement; BCAM Toolkit, which was validated in the UK.<sup>49</sup> The translated and validation of BCAM into the Malay language (BCAM -M) form focused on the women population; hence, some of the items related to menstrual history, child bearing age, menopausal age were removed and modified to the male-to-female transgender topic.

The add-on items were gynecomastia, history of Klinefelter syndrome, prolonged hormonal therapy usage, history of orchiectomy, obesity issues, and breast implant surgery. The researchers felt that these items should be added to the domains since most males to female transgenders people underwent breast reassignment surgery, particularly breast implant and excessive hormonal therapy without proper supervision. Regarding the translated version of BCAM to Malay language which was done by expert panels in 2017, the Item-Content validity range from 0.83 to 1.0. Whilst, the Cronbach alpha scores for the knowledge about breast cancer symptoms (0.83) and the barriers to healthcare seeking items (0.75) were high. Compared to our study,

the values of the reliability of the 28 items for this Malay Version of Breast Cancer Awareness scale by Cronbach Alpha is 0.864, achieving the minimum threshold of 0.70 and comparable to the BCAM-M. In addition, our Cronbach alpha scores for domain knowledge of symptoms and clinical features (0.858); confidence, skills and behaviour in relation to breast self-examination (0.779); barriers in seeking medical help (0.700) which is good and acceptable respectively.

Our instrument was developed explicitly for the male-to-female transgender community addressing their needs and transgender issues, which covered the five main domains namely: Domain 1; knowledge of symptoms and clinical features; Domain 2, confidence, skills, and behaviour concerning breast self-examination; Domain 3, barriers in seeking medical help; Domain 4, knowledge of breast screening programs and; Domain 5, knowledge of risk factors for breast cancer. Domain 5 on knowledge of the risk factors was modified to address similar to the men breast cancer risks as the male-to-female transgender are genotypically and phenotypically males originally. The domains were developed based on literature related and consistent with previous research and screening tools and being modified according to literature concerning the risk of cancer among male-to-female transgender.<sup>49,50</sup> In general, Cronbach's alpha reliability coefficient ranges between 0 and 1.

Nunnally (1978) recommended that an acceptable level of coefficient alpha to maintain an item on a scale is at least 0.70. However, after analysis, it showed that the values of Cronbach alpha for Domains 4 and 5 were unacceptable while another domain was acceptable. Hence, further evaluation and additional items for Domains 4 and 5 need to be improved in the future. In this study, the sample size of 300 subjects also fulfil the minimum requirement for validation study.<sup>46</sup> Although this marginalized population is hard to be contacted, this study's sample size was achieved despite stigmatization and medical barriers. Exploratory factor analysis (EFA) was crucial to test a hypothesized factor structure for a set of measures and identify any redundancy. However, the analysis did not proceed to CFA analysis for this study due to time



constraints. Reliability tests for equivalence of the measure in examining consistency between two versions of an instrument or across different people using the instrument. It has been recognized that the reliability of a construct or variable refers to its consistency, stability, and dependency on the scores in the questionnaire. In addition, the construct or variable being measured must be stable or constant. Specifically, reliability is the degree of consistency exhibited by measuring repeated identical conditions.<sup>46</sup> On this ground, the reliability of the pilot instrument of this study was estimated using the internal consistency reliability, which was Cronbach's alpha test. Internal consistency describes the degree to which all items in a questionnaire measure the same concept or construct. Hence it is connected to the inter-relatedness of the items within the test.

This study has shown that the instrument is convenient, self-report, inexpensive, easily understood, easy to use; supported by strong internal consistency with each item relations based on achievable Cronbach Alpha of 0.84<sup>46,50</sup> which further helped the researcher for better understanding of male-to-female transgender needs, health care awareness and their barriers related to the breast cancer awareness.

## CONCLUSION

In conclusion, the values of the reliability of the 28 items for this Malay version of Breast Cancer Awareness scale by Cronbach Alpha was 0.864, achieving the minimum threshold of 0.70, hence that the items representing the constructs were reliable and acceptable. Therefore, these questionnaires may be used as a screening method to assess male-to-female transgender breast cancer awareness, which subsequently aids this marginalized community for better health care.

## LIMITATIONS AND FUTURE STUDIES

As the Covid pandemic arose, the data gathering was subsequently affected. Some male-to-female transgender in the Kuantan area could not be reached out. Thus, the

of Kuantan by postage. The districts involved were in Kota Bharu, Kelantan and Langkawi, Kedah, as these two areas were handled by NGOs involved in male-to-female transgender society. As the questionnaire used the Malay language, the limitation is that it can only be used in Malaysia as the Malay language is the national language of Malaysia. In addition, there are also different dialects according to each district. In the future, the questionnaire should be translated into English language or other languages, so it can be used globally. More items should be added to Domain 4 (knowledge of breast screening programs, and Domain 5 (knowledge of risk factors for breast cancer) to achieve the acceptable Cronbach alpha value.

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