Pilot cross-sectional study of foreign domestic workers supporting the basic healthcare needs of older persons in the community

Kim Wai Ang,1,2 Yi Ling Eileen Koh,1 Xue Fei Wang,1 Azizah Mohd Yusoff,1 Ai Meng Tan,1 Xin Yi Cindy Poh,1 Ning Zhang,1 Ngiap Chuan Tan1,2

ABSTRACT

Objective This pilot study aimed to determine the proportions, level of knowledge, anxiety and confidence of foreign domestic workers (FDWs) who were involved in supporting the healthcare needs of older persons with long-term non-communicable diseases.

Design The pilot study used a cross-sectional and descriptive design.

FDWs who accompanied the older adults attending a primary healthcare setting in Singapore. 100 eligible FDWs’ demographic data, knowledge and confidence level of caregiving in food preparation, medication supervision, exercise, blood pressure (BP), blood glucose (BG) monitoring and anxiety level assessed by the Generalised Anxiety Disorder-7 scale were recorded. Descriptive statistics were presented and performed. Items on confidence were regrouped into two groups of ‘very’ versus ‘no/a little/moderate’. Knowledge scores and caregiving tasks were assessed with items on confidence using Mann-Whitney U test and χ² test, respectively.

Results The FDWs were from Indonesia (60%), Philippines (23%) and Myanmar (14%). Their mean age was 33 years with an average of 5.8 years working experience; 62% self-reported previous caregiver training for elderly. The mean age of care-recipients was 81 years. Knowledge of FDWs on BP and BG monitoring was low (<50% answered correctly). Among the 55 FDWs who were required to perform BP monitoring, 45.5% lack confidence. Similarly, 40% of the 30 FDWs were not confident in performing BG monitoring. Those with very high confidence levels had higher knowledge on BP and BG monitoring. Of those who were involved in medication supervision (n=86), 36% lacked confidence. The majority of the FDWs (96%) were not affected by anxiety in managing these healthcare tasks for older persons.

Conclusion More than half of the FDWs supported healthcare needs of older persons but they had inadequate knowledge and lacked confidence in performing the healthcare-related tasks.

BACKGROUND

Populations are rapidly ageing in Asia. United Nations (2015) estimated that up to 60% of the world’s older adults aged 60 years and above will reside in Asia by 2030.1 Among Asian countries, Singapore experiences the highest growth rate of the older population. The proportion of residents aged 65 years and above has increased from 8.8% in 2009 to 14.4% in 2019.2 Many older Asian adults prefer home-based care which means family members will take up caregiving roles.3 4 However, the traditional reliance on Asian family caregivers to care for the frail older persons in the household has evolved due to increasing numbers of women in the workforce, expansion of nuclear families and socioeconomic shift in the community.5 6 7 Most adult family members hold full-time jobs or have other caregiving roles. Foreign domestic workers (FDWs) are hired as additional family caregivers in many communities in East and South-East Asia (Hong Kong, Taiwan, China, Singapore, Malaysia). FDWs are also common in Northern, Southern, Western Europe, but not as common in Eastern Europe and America.6 An FDW is usually a stay-in waged, migrant woman attached to one employer to work in the respective household7 but studies on them are limited.
In Singapore, the vast majority of the FDWs originate from the neighbouring South-East Asian countries, including Indonesia, Philippines and Myanmar. They have to be aged 23 to below 50 years during their permit application to work in Singapore. Those who are 50 years and older need to renew their work permits until they reach 60 years of age. They require 8 years of formal education with a recognised certificate. These FDWs have been allowed to work in Singapore since the 1990s, when there were only 50,000 FDWs. By December 2019, there were over 260,000 FDWs in Singapore.9

These FDWs are often employed to look after the older family members, aside from managing other household chores.9 Almost half of the families hired FDWs for this primary purpose.10 11 Non-communicable diseases (NCDs) are prevalent in older adults aged 65 and above.10 More than 80% have one or more NCDs, such as type-2 diabetes mellitus (T2DM), hypertension or dyslipidaemia.3 The duties of looking after an older adult can be divided into cleaning, cooking and caring.12 The boundary between care work and domestic tasks is usually blurred.13 Most FDWs are involved in looking after the older adults in the household. However, over half of them do not have geriatric care experience or formal training.14 Families hire FDWs despite concerns that the latter lack proper training in caring for frail older adults.15 The selection of FDWs often relies solely on their profiles provided by commercial hiring agencies, including nationality, age and previous working experience. This is followed by brief assessment over short telephonic interviews or conversation over social media platforms. Objective evaluation of their competency in providing geriatric care is lacking.5

Older care recipients with NCDs require regular monitoring of disease status such as blood pressure, capillary glucose for those with diabetes mellitus, medication adherence, diet and physical activity supervision.10 Poorly managed NCDs can lead to complications and morbidity. Studies have reported low level of knowledge in managing NCDs among family caregivers.16–18 Behaviour change theories and a study by Zeng et al suggest that individuals with sufficient knowledge, specifically caregiver knowledge, skills and confidence level in managing older persons, the proportions of those with suspected anxiety, as screened by the 7-item Generalised Anxiety Disorder (GAD-7) scale, and its association with their healthcare-related tasks.

The FDWs were postulated to be willing to participate in the English-based questionnaire due to adequacy of knowledge, skills and confidence level in managing older persons in domiciliary setting and corresponding low level of anxiety.

AIMS
Among these FDWs who were managing older persons with NCDs in the same household, the primary aim of this pilot cross-sectional study was to assess the proportion of them who could complete an English-based survey. The secondary aims were to determine their knowledge, skills and confidence in supporting the healthcare needs of older persons, the proportions of those with suspected anxiety, as screened by the 7-item Generalised Anxiety Disorder (GAD-7) scale, and its association with their healthcare-related tasks.

METHODS
Study design
This pilot study used a cross-sectional, descriptive design. An interviewer-administered questionnaire survey was conducted using a novel questionnaire on FDWs, who accompanied their older wards for their medical review at selected public primary care clinics in eastern Singapore.

Setting and participants
Recruitment was carried out at SingHealth Polyclinics (SHP) between May and June 2018. SHP comprising eight public primary care clinics (polyclinics) in eastern Singapore, serve ambulatory patients in the community. The four selected study sites (Bedok, Bukit Merah, Tampines and Outram Polyclinics) are located in mature housing estates with large numbers of senior residents.2

Nursing students from the School of Health Sciences in Ngee Ann Polytechnic served as research assistants to screen FDWs and recruited them into the study after obtaining their written informed consent. The latter translated and explained the terms in the questionnaire, when doubts from the FDWs arose. The questionnaire survey was administered in a separate room away from the care recipients to ensure privacy and autonomy for the
FDWs to provide their responses. Demographic data was also obtained from the care-recipients, including their sex, age and medical conditions.

Data were then double checked by a site-investigator to ensure completeness of responses. Each participant received a copy of the consent form and an SGD5 (US$3.80) grocery voucher at the end of the interview.

**Inclusion and exclusion criteria**

FDWs were recruited if they were (1) between 23 and 55 years old, (2) able to speak and understand basic English, (3) caring for an older person, aged 60 years and older, who were managed in polyclinics for any one or more of these conditions (T2DM, hypertension, dyslipidaemia) and (4) involved in at least one care aspect of healthcare provision such as diet, medication management and monitoring devices.

T2DM, hypertension and dyslipidaemia are among the top four medical conditions accounted for by the 2.5 million attendances in the institution. Care-recipients with other co-morbidities were also included.

We excluded FDWs who reported (1) no involvement in the care of older persons, or (2) those older persons without any medical conditions, or (3) those looking after older persons only on selected days of the week. These FDWs were not regarded as their primary caregivers, as they usually performed housework without the need to look after older persons.

**Questionnaire**

The questionnaire sought information on the demographic characteristics of the FDWs and their care-recipients, FDWs’ knowledge and confidence level on caregiving tasks and the GAD-7 scale. As no questionnaire has been developed to assess basic healthcare-related literacy of FDWs, the investigators created a scale comprising twelve true/false questions to cover their knowledge on managing the diet, exercise, medication and clinical monitoring. The questions were adapted from the local official Health Promotion Board health education brochure on the management of T2DM, hypertension and dyslipidaemia. The confidence level in managing the healthcare tasks in these domains was self-rated on a 4-point Likert scale, categorised into ‘no’, ‘a little’, ‘moderate’ and ‘very’ confident. The GAD-7 scale is a valid tool to screen for generalised anxiety disorder in clinical practice and research. It has a good internal consistency (Cronbach α=0.92) and test-retest reliability (intraclass correlation=0.83). It is brief, easy to understand and has been shown to be reliable and valid in the Filipina population and Indonesian college students. Proficiency in English and a minimum of 8 years of formal education are criteria for a work permit in Singapore, and thus the participants were postulated to have adequate understanding to fill the questionnaires. The participants appraised the seven questions using scores ranging from 0 to 3, corresponding to the respective frequencies of ‘not at all’, ‘several days’, ‘more than half a days’ and ‘nearly every day’. The scores for the individual questions were added up to a total score. The total scores of 5, 10, 15 are taken as cut-offs for mild, moderate and severe anxiety. A cut-off score of 10 or more indicates a need for further anxiety assessment by a healthcare professional.

A multidisciplinary primary healthcare professional team comprising a doctor, a senior nurse, a medical social worker, a pharmacist and a dietitian reviewed and refined the entire questionnaire. It was piloted with several FDWs who were assessed if they understood each of the questions, before it was finalised for use in the main study.

**Sample size**

Based on the recommendation of Viechtbauer et al for pilot studies, the minimum sample size required was 59. To buffer for incomplete data entry by the FDWs in view of uncertainty and possible variability of their English literacy, 100 subjects were recruited.

**Data analysis**

Descriptive statistics of training needs and baseline characteristics of the study subjects were presented in frequency and percentages. The association between their required caregiving tasks and confidence in their tasks were performed using χ² test while association between knowledge and confidence of respective tasks were assessed using Mann-Whitney U test. Items on confidence level were regrouped into two groups of ‘very’ versus ‘no/a little/moderate’.

The score for the three knowledge-related questions in each of the four domains was summed up for the correct answers. The score for each question ranged from 1 to 3, resulting in a maximal total knowledge score of 12. The confidence level was scored 1 for ‘no’, 2 for ‘a little’, 3 for ‘moderate’ and 4 for ‘very’ confident. The overall confidence level was the sum of the four confidence-related questions. A p value of <0.05 was considered statistically significant.

**Patient and public involvement**

No patient was involved in the design of the study protocol. The participants were not included in the conceptualisation and design of the study because they have to accompany their care recipients for their NCD management and their employers may not agree due to time constraint, although we had several FDWs to assess if they understood each of the questions before the questionnaire was finalised for use in the main study.

**RESULTS**

**Response rate**

A total of 104 FDWs were enrolled but 100 completed questionnaires were analysed. Four FDWs were excluded because of language difficulty and incomplete administration questionnaire due to time constraint. The
recruitment was completed over 8 weeks, suggesting feasibility of this pilot study.

**Demographics of FDWs and care-recipients**

Table 1: the mean age of the FDWs was 33.0 years (SD=6.3). The majority of them (n=60; 60%) were from Indonesia, while the rest were from Philippines (n=23; 23%), Myanmar (n=14; 14%), and 1% each from Cambodia, India and Malaysia, respectively. The FDWs had worked in Singapore as domestic helpers for a mean of 5.8 years (SD=5.1); 55% (n=55) of them had experience caring for older persons. 60% (n=60) of them had looked after the care-recipients for 1–2 years and their main language used to communicate with care-recipients was English. Overall, 4% (n=4) of them scored 10 or more based on the GAD-7 scale, indicating minimally moderate anxiety level.

The majority (n=74; 74%) of the care-recipients were females, with mean age of 81.3 years (SD=8.4). They were mostly Chinese.

**FDWs’ caregiving and domestic tasks**

Table 2: the majority of the FDWs needed to prepare meals (n=90; 90%), ensure safety of care-recipients during exercise (n=89; 89%), prepare and supervise medication intake (n=86; 86%). Slightly more than half (n=55; 55%) of FDWs were required to perform home blood pressure (BP) monitoring and about one-third (n=30; 30%) were required to perform blood glucose (BG) monitoring. Bringing care recipients for medical follow-up (n=83; 83%) and doing other household chores (n=96; 96%) were also part of their tasks. However, more than half (n=59; 59%) of family members shared caregiving tasks with the FDWs. Only 39% (n=39) were hired specifically to care for the care-recipients.

**FDWs’ knowledge and confidence level on caregiving tasks**

Table 3: the FDWs scored a mean of 8.2 (SD=2.4) out of 12 for knowledge pertaining to meal preparation and dietary requirements, preparation and supervision of medication intake, exercise supervision, BP and BG monitoring. They scored higher on meal preparation (mean=2.3, SD=0.8), exercise (mean=2.5, SD=0.9) and medication (mean=2.0, SD 0.9) as compared with BP and BG monitoring (mean=1.3, SD=1.0).

The FDWs scored a mean of 1.9 (SD=1.4) out of 4 for their confidence in the caregiving tasks. They were least confident in BP and BG monitoring. Only one-third of them were very confident in using devices to monitor BP and BG.

**Association between FDWs’ caregiving tasks and confidence in their tasks**

Table 4: there was a significant association between confidence level, clinical monitoring and medication supervision, respectively. The FDWs were significantly less confident in measuring BP (p<0.001) and BG (p<0.002). More than half (64%) of them were very confident in medication supervision (p<0.001).
Association between FDWs’ knowledge and confidence of caregiving tasks

Table 5: associations between levels of confidence and knowledge on medication supervision (p=0.049), exercise supervision (p=0.012) and clinical monitoring (p=0.011), respectively were statistically significant. Those with very high level of knowledge were significantly confident in managing the respective tasks.

Association between FDWs’ knowledge and confidence with demographic

Table 6: there was a significant association between age and duration of employment with knowledge (p=0.015; p=0.005). The duration of employment (p=0.043), but not age (p=0.076), was significantly associated with total confidence score in the care task.

DISCUSSION

A pilot study to assess the knowledge and level of confidence of FDWs in supporting the health of older persons was successfully completed within 2 months, attesting to the feasibility of conducting research on a potentially at-risk subset of the population.

The study has furnished important data for sample size estimates and design of a future randomised controlled interventional trial to upskill the FDWs to better manage the healthcare of the geriatric population. It has provided an opportunity to examine the training and basic healthcare delivery of these FDWs.

The FDWs in this study appear to be aware of healthy lifestyle practices, such as cutting down on salt and oil during meal preparation. They were aware of healthier options such as whole grains, the role of exercise and importance of medication adherence in the management of NCDs. They assisted their care-recipients in activities of daily living and also performed healthcare-related tasks like medication supervision and clinical monitoring of BP or BG.

The results revealed that older FDWs and those with longer length of employment were more knowledgeable in catering to the healthcare needs of older persons. The FDWs in this study were older and had worked as domestic helpers for an average of 5.8 years. Older FDWs are generally more matured, experienced and better equipped with knowledge to provide care compared with the younger domestic helpers.10 Due to their length of employment, these FDWs have more time and...
opportunities to interact, communicate, bond and build rapport with their family members and care-recipients.30 Studies have also alluded to the literacy on disease management as a predictor of higher caregiver confidence.31 32 This study has shown that the more knowledgeable FDWs were more confident in accomplishing the healthcare-related tasks. It also reveals significant association between duration of employment and confidence in delivering caregiving tasks.

Nonetheless, more than half of the FDWs were unaware of the healthier choice labelling on food products on sale locally. This healthier choice symbol is unique in Singapore. The FDWs could not recognise and understand the label without prior induction. Their employers may not require the FDWs to carry out marketing or buy food products. Such a knowledge gap can be addressed in their pre-employment training conducted by the FDW hiring agencies.

The FDWs were less cognizant of the side effects of common therapeutics for NCD treatment. Almost half of them were not aware that medications for high BP might cause giddiness. This finding is consistent with studies which reported caregivers’ insufficient skills and

Table 3  Foreign domestic workers’ knowledge and confidence level on caregiving tasks (N=100)

| Questions on knowledge                                                                 | Frequency N (%)  |
|----------------------------------------------------------------------------------------|------------------|
| Meal preparation and dietary requirement, mean score (SD)                               | 2.3 (0.8)        |
| Healthier cooking method include cutting down on oils, fats and salts                   |                  |
| True                                                                                    | 93 (93.0)        |
| False/do not know                                                                       | 7 (7.0)          |
| I should choose product with healthier choice symbol                                    |                  |
| True                                                                                    | 52 (52.0)        |
| False/do not know                                                                       | 48 (48.0)        |
| Whole grain foods such as brown rice, wholemeal bread, oats are healthier choice        |                  |
| True                                                                                    | 87 (87.0)        |
| False/do not know                                                                       | 3 (13.0)         |
| Medication preparation/supervision, mean score (SD)                                     | 2 (0.9)          |
| Taking medication daily can better manage chronic disease                               |                  |
| True                                                                                    | 86 (86.0)        |
| False/do not know                                                                       | 14 (14.0)        |
| Medications for high blood pressure may cause giddiness                                 |                  |
| True                                                                                    | 56 (56.0)        |
| False/do not know                                                                       | 44 (44.0)        |
| Medications can be taken at any time you want                                          |                  |
| True                                                                                    | 62 (62.0)        |
| True/do not know                                                                        | 38 (38.0)        |
| Exercise, mean score (SD)                                                               | 2.5 (0.9)        |
| Exercise can help to lose weight and improve sugar/blood pressure control               |                  |
| True                                                                                    |                  |
| False/do not know                                                                       | 12 (12.0)        |
| It is important to check with doctor/nurse to decide what exercise is suitable          |                  |
| True                                                                                    | 79 (79.0)        |
| False/do not know                                                                       | 21 (21.0)        |
| Exercise is not important to elderly                                                    |                  |
| True                                                                                    | 80 (80.0)        |
| True/do not know                                                                        | 20 (20.0)        |
| Blood pressure and blood glucose monitoring, mean score (SD)                            | 1.3 (1.0)        |
| Home blood pressure should be checked in the morning only                               |                  |
| True                                                                                    | 36 (36.0)        |
| False/do not know                                                                       | 63 (63.0)        |
| Blood pressure may be higher at the clinic than at home due to factors such as lack of sleep or anxious at the clinic |                  |
| True                                                                                    | 49 (49.0)        |
| False/do not know                                                                       | 50 (50.0)        |

Continued
17 18 33 The FDWs’ knowledge in recognition of symptoms in managing more complex caregiving tasks (N=100)

| Confidence level          | Very | No/a little/ moderate | P value |
|---------------------------|------|-----------------------|---------|
| Required to prepare meals as caregiving task | Yes  | 44 (48.9)             | 46 (51.1) | 0.594 |
|                           | No   | 4 (40.0)              | 6 (60.0) |
| Required to prepare/supervise medications | Yes  | 55 (64.0)             | 31 (36.0) | <0.001 |
|                           | No   | 1 (7.1)               | 13 (92.9) |
| Required to ensure safety during exercise as caregiving task | Yes  | 49 (55.1)             | 40 (44.9) | 0.082 |
|                           | No   | 3 (27.3)              | 8 (72.7) |
| Required to measure BP    | Yes  | 30 (54.5)             | 25 (45.5) | <0.001 |
|                           | No   | 7 (15.6)              | 38 (84.4) |
| Required to measure blood glucose | Yes  | 18 (60.0)             | 12 (40.0) | 0.002 |
|                           | No   | 19 (27.1)             | 51 (72.9) |

BP, blood pressure.

Table 5  Association between foreign domestic workers’ knowledge and confidence of caregiving tasks (N=100)

| Confidence level          | Knowledge scores on (max 3) | P value |
|---------------------------|-------------------------------|---------|
| Meal preparation and dietary requirement |                      | 0.680 |
| No/ A little/ Moderate    | 2.3 (0.9)                    |         |
| Very                      | 2.4 (0.7)                    |         |
| Medication preparation/ supervision | 0.049                          |
| No/ A little/ Moderate    | 1.8 (1.0)                    |         |
| Very                      | 2.2 (0.8)                    |         |
| Supervision of suitable exercise | 0.012                          |
| No/a little/moderate      | 2.2 (1.1)                    |         |
| Very                      | 2.7 (0.7)                    |         |
| Using blood pressure, glucometer set | 0.011                          |
| No/a little/moderate      | 1.1 (1.0)                    |         |
| Very                      | 1.6 (0.9)                    |         |

Ang KW, et al. BMJ Open 2022;12:e051877. doi:10.1136/bmjopen-2021-051877
recipients. The need to implement basic healthcare-related training to empower the FDWs with the necessary skills in order to deliver competent eldercare seems imperative in a rapidly ageing population, such as those in Singapore.

Caregiver education has been reported to be effective in raising their awareness of the common medical conditions, reducing caregiver burden, alleviating anxiety and increase their confidence. A randomised controlled trial on caregivers for older patients with cancer found that individualised caregiver training led to significant increase in caregiver self-efficacy and knowledge in the treatment group, as compared with the control group.43 Another study showed that a community-based caregiver training programme focusing on their roles, knowledge and skills in managing persons with dementia demonstrated positive outcomes. Those who completed the training had scores showing significantly reduced depression, burden and stress reaction to their care recipients’ deviant behaviours when compared with those in the control group.44 Extending caregiver education to the FDWs seems to be a logical approach based on the results of these studies.

The local polyclinic is often the first contact point of FDWs taking care of patients with NCDs. Hence the polyclinics seem to be ideal sites to engage and train the subset of the FDWs who are comanaging older persons with their employers. The polyclinic nurses are already training patients and their families in managing their NCDs in regular workshops. What is needed is for the nurses to expand the scope and tailor the workshop curriculum to cater to the FDWs.

Currently, FDWs only receive ad-hoc individual counselling when they accompany their care-recipients for medical review at the polyclinics. This study has identified specific training needs of FDWs to optimise their geriatric care delivery to older persons. The key training curriculum should cover basic knowledge of clinical monitoring of older persons and to supervise their medications intake.

Primary care nurses are the preferred facilitators for such workshops as they are trained in health promotion and disease prevention. They comanage geriatric patients with the physicians in multidisciplinary care teams. They spend significant time interacting with patients and their caregivers to understand their healthcare needs during their medical review at the polyclinics.44 Hence, they can impart care tips to the FDWs at the interactive workshop, and to respond to specific queries from the FDWs themselves.

### Strengths and limitations

This study was likely the first to specifically assess the knowledge, confidence level and anxiety of FDWs in supporting geriatric healthcare in the local community. The results highlighted deficiencies in their employment system and processes which limit their capacity to optimise care for their employers’ older family members.

However, the study has its limitations. Only FDWs who spoke and understood English were recruited. Hence, the results may not be generalizable to the rest of the local FDW population, who are less proficient in English. Nonetheless, the latter are likely to represent a minority of FDWs due to the English language proficiency requirement to work in Singapore. As this sample includes FDWs who accompany their care-recipient to the clinic, the proportion of FDWs who are involved in healthcare as part of their caregiving tasks is likely to be higher than the general pool of FDWs in Singapore.

The questionnaire was developed by the investigators, as such instrument is not available due to scarce studies on FDWs. Although the questionnaire was reviewed by multidisciplinary primary healthcare professionals and piloted with FDWs, the validity and reliability could be disputed.

Ideally, the questionnaires should be available in the FDWs’ native languages such as Tagalog and Bahasa Indonesia. Nonetheless, most Filipino FDWs were conversant in English. The local site investigators served as backup translators to assist the questionnaire administration in Malay, which most Indonesian FDWs could understand. However, future research may consider allowing participants to choose to answer the questionnaire in either their native language (eg, Tagalog) or English.

### CONCLUSIONS

The successful recruitment of participants within 8 weeks and completion of the English-based survey by majority of FDWs reflect feasibility of the study on this potentially vulnerable population. The FDWs had variable level of knowledge to cater to a range of healthcare needs of older persons but most would require specific training in performing the health-related tasks such as clinical monitoring.

In the next phase, a tailored polyclinic-based training workshop will be developed to empower the FDWs with knowledge and skills to perform geriatric care tasks. This will be followed by an adequately powered randomised controlled trial to determine its effectiveness in improving

| Table 6 Association between foreign domestic workers’ knowledge and confidence with demographic (N=100) |
|-----------------|----------|---------|-----------------|---------|
|                | Knowledge (r) | P value | Confidence (r)  | P value |
| Age            | 0.243      | 0.015   | 0.178           | 0.076   |
| Duration looking after care recipients | 0.282     | 0.005   | 0.202           | 0.043   |


geriatric care and its impact on raising their satisfaction and that of their employers.

The findings will need to be evaluated and interpreted in the light of the limitations due to the study design. However, the measures taken to address the potential limitations would have strengthened the approach in testing the novel hypotheses. This pilot study provides sufficient data to develop future interventional trial in empowering the FDWs to provide quality geriatric healthcare.

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Competing interests None declared.

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Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Ethical approval was obtained from SingHealth Centralized Institutional Review Board (CIRB no: 2018/2271). The study was conducted according to the Good Clinical Practice guidelines and adhered to the Declaration of Helsinki principles. Participants gave informed consent to participate in the study before taking part.

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

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ORCID iDs

Kim Wai Ang http://orcid.org/0000-0002-9611-2239
Ngiap Chuan Tan http://orcid.org/0000-0002-5946-1149

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