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Relicensing Practices of Taxi Drivers and Crane Operators Aged 70 Years and above in Singapore

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Abstract: Singapore is a rapidly ageing society, underpinned by national policies to promote successful and active ageing. Whilst older worker participation in the workforce is encouraged, policymakers are challenged to ensure that work competency is not compromised with any normal age- and/or health-related changes. This paper will briefly outline how policymakers responded to the needs of two subgroups of older workers aged 70 years and above (taxi drivers; crane operators) who desire to continue working in the last two decades. Whilst a mandatory retirement age policy exists for older taxi drivers in Singapore, there is none for older crane operators. Despite this, stricter relicensing protocols were introduced for both types of workers, with active collaboration involving additional occupational therapy services for functional work competency assessments to complement the routine medical fitness screening. Comparisons will be made of these two relicensing frameworks, including the mention of any relevant studies to align with the call of evidence-based practices. In mid-2020, the relicensing policy for older taxi drivers was revised based on findings of a retrospective national database study. Currently, a 4-year national database study on older crane operators aged 70 years and above is being undertaken with preliminary findings to be reported.

Keywords: taxi driver; crane operator; licensing; evidence-based practice; assessment; ageing; active; seniors; Asia; elderly

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1. Introduction

Population ageing, arising from the decline in fertility rate and improvements in survival, is a global phenomenon across both developed and developing nations. This demographic shift is more rapid and compressed in Asia than in the West, occurring within a 20 versus 80-year time frame, respectively. In Asia, a twofold increase from 549 million in 2017 to nearly 1.3 billion in 2050 of people aged $\geq$ 60 years has been projected. By 2050, Singapore (40.1%) will be amongst the top five Asian ageing societies with older people aged $\geq$ 60 years, along with Japan (42.4%), South Korea (41.6%), Taiwan (41.3%) and Hong Kong (40.6%) (United Nations 2017). Notably, Singapore has been ranked as the second-fastest ageing society in the world after Japan, with older people aged $\geq$ 65 years rising from 1:12 in 2009 to 1:5 in 2030, with an increase in average life expectancy to 82–86 years for men and women, respectively (Ministry of Community Development, Youth & Sports 2009).

Successful ageing became an important national agenda in Singapore in 2007 with the Ministerial Committee on Ageing tasked to coordinate strategies and implement the vision, with four main pillars: employability and financial security; holistic and acceptable

healthcare and services; ageing-in-place; and active ageing (Ministry of Community Development, Youth & Sports 2009). However, as early as 2006, a subgroup of self-employed, older vocational drivers in the public transport industry pre-empted policymakers by lobbying to extend the mandatory retirement age of taxi drivers beyond 70 years of age to allow for active ageing. This occurred before the launch of any official engagement with the public to obtain their feedback on how policies can facilitate ageing well.

Between June 2014 and May 2015, policymakers conducted 50 focus groups (N = 4000) in public spaces (eating places, libraries, universities) and online with older Singaporeans to obtain their views on ageing policies (Ministry of Health 2016). Many participants expressed a keen desire to work beyond the general official retirement age (62–65 years), citing reasons of financial independence and retirement adequacy (living expenses, healthcare, long-term care needs) and to keep active, "*I want to work for as long as I can. It keeps my mind active*" (Ministry of Health 2016, p. 12). They wanted meaningful job opportunities and a safe workplace that had a fair and inclusive culture, offering job flexibility, redesign and training features suitable for older workers (Ministry of Health 2016). The overall findings from these focus groups were subsequently integrated into future policies. The Singaporean concept of active ageing has since been elucidated to represent a holistic approach that helps a person to optimize their physical, mental and social health, be actively engaged in society and have the financial security to lead a good quality of life (Ministry of Health 2020).

In the absence of state-funded pensions, local retirees depend on personal savings (Hirschman 2021), which can be supplemented by financial support from their children, reciprocated by intergenerational exchanges whereby parents offer practical assistance in chores, active grand-parenting skills or emotional support (Mehta 1999; Verbrugge and Ang 2018). Family is the first line of support for older Singaporean financially, whereby the Maintenance of Parents Act (Ministry of Social and Family Development n.d.) legally binds children with adequate income to provide basic financial support for ageing parents aged $\geq$ 60 years when needed. On the other hand, financial dependency on children can also evoke feelings of conflicts, distress, shame and guilt with strain on family harmony and impacting negatively on psychological health, according to older Singaporeans aged $\geq$ 60 years (Shiraz et al. 2020). In a mixed-method study on understanding older Singaporean's lay perceptions of successful ageing in those aged 50–69 years (N = 1540), self-sufficiency received the highest acknowledgment, with at least half of the sample simultaneously expressing a desire for independence from and dependence on family (Feng and Straughan 2017). These societal and cultural factors provide some insights as to why older Singaporeans have a strong desire to work.

At the same time, assessing the capability of older workers to be reemployed in ageing societies poses new challenges to national policymakers. Licensing practices differ between industries, each with its own regulatory body or licensing authority. In addition, licensing practices within an industry vary between countries and in some regions, even within its borders. Currently, information on licensing practices must be accessed separately via grey literature from available on-line, official websites of various countries. The contents of these websites are generally designed to inform applicants of the licensing requirements in the specific industry. Furthermore, there is a scarcity of published studies on licensing policies or frameworks (descriptive, comparative, evidence-based, cost-effective) that can guide policymakers on the formulation of licensing practices to meet the challenges of ageing societies. By contrast, the existing body of research is weighted on the ageing process and potential challenges of older workers from declining health that could impact work abilities.

Based on the biomedical model of health, ageing is associated with normal age-related changes (e.g., slower processing speed and motor reaction time) and health-related changes (e.g., cataracts, hearing impairment, diabetes, stroke, musculoskeletal disorders). Chronic medical conditions and medications may increase over time in an older person. Cumulatively, these changes may impair functional abilities for work-related demands. In this respect, licensing authorities to play a crucial role by defining the licensing criteria in its

system of initial application and subsequent renewal cycles, to screen out potentially at-risk workers. Traditionally, licensing policies have been underpinned by a strong reliance on the certification of medical fitness to work. Besides health clearance, older workers may also need to pass other stipulated practical or skills-based assessments. Overall, the outcome of these assessments is to ensure fitness-to-work without compromising work standards and safety (Chan et al. 2010a, 2010b; Ministry of Manpower n.d.).

The aim of this paper is to address the gap in the literature by describing the evolvement of relicensing policies and practices in Singapore with regards to two subgroups of older workers aged ≥ 70 years in the last two decades, to respond to successful and active ageing needs. The older workers are from the (i) public passenger transport industry (taxi drivers as from 2006) and (ii) construction industry (crane operators as from 2016). In each of the relevant subsections, a brief background of the industry will be given before describing its relicensing framework, including the local innovative inclusion of driver-assessor occupational therapists (OTs) and subsequent research undertaken to refine the licensing policy for evidence-based practice. Driver-assessor OTs are therapists with additional qualifications to assess the driving performance of individuals with health-related impairments or disabilities so as to identify and manage at-risk drivers or workers. Key features of both relicensing frameworks have been summarized in Table 1.

Table 1. Relicensing practices of Taxi Drivers aged ≥ 70 years in Singapore.

	Taxi Drivers Aged ≥ 70 Years	**Crane Operators Aged ≥ 70 Years**
Regulatory agency/Licensing authority	Land Transport Authority	Ministry of Manpower
Mandatory age limit/retirement age	Yes (2006: age limit raised from 70 to 73 years) (2012: age limit raised from 73 to 75 years)	No
Year of implementation/revision	2006; 2012; 2020	2016
Trigger rationale for new relicensing practices	Bottom-up approach: lobbying by older taxi drivers to LTA	Top-down approach: adapted from the LTA older taxi drivers' policy
Assessment protocol: • Using a standard form	Yes (Assessment on Fitness to Drive for Taxi Drivers Aged 70 years and above)	Yes (Crane Operator Medical Examination Form B for Crane Operators aged 70 years and above)
• Visit to a self-chosen community doctor		
- Declaration of accurate self-report	Yes	Yes
- Consent for communication between doctors	Yes Yes	Yes Yes
- Self-reported medical history to the doctor	Yes	Yes
• Medical examination by community doctor	Yes	Yes
• Investigative blood samples	No	Yes: fasting blood glucose and lipids
• Screening test for dementia	Yes	Yes
• Medical fitness outcome: fit or unfit to renew; to undergo the OTA if deemed medically fit	Yes (70, 73 and 74 years of age)	Yes (annually)
• Form returned to applicant (after medical fitness outcome filled in)	Yes	Yes
• Form returned to regulatory agency (after medical fitness outcome filled in)	No	No

Table 1. *Cont.*

	Taxi Drivers Aged ≥ 70 Years	Crane Operators Aged ≥ 70 Years
• Applicant who passed medical fitness screening: Visit the designated hospital for the OTA	Yes (2006–mid-2020) at 70, 73 and 74 years of age: off-road tests (no cut-off scores) and on-road driving assessment by occupational therapist and driving instructor	Yes (2016–to date): Annual off-road tests (cut-off scores for all subtests).
	Criteria to pass the OTA: Pass in the on-road driving assessment (with no limit on number of retests) essential for licence renewal from 2006 to mid-2020	Criteria to pass the OTA: Pass all off-road tests. Failure in the OTA → option for practical skills assessment at the BCA, where a pass is essential for licence renewal
• Applicant who passed medical fitness screening: Visit to a local driving centre	Yes (mid-2020—to date): on-road driving assessment by trained driving instructor (with no limit on the number of retests)	Not applicable
	Criteria to pass: Pass the on-road assessment (with no limit on the number of retests) is essential for licence renewal	Not applicable
• Applicant who passed medical fitness screening Visit to the local BCA	Not applicable	Optional: if wishes to qualify for a crane operator licence after failing the OTA
Other relicensing criteria	Taxi driver refresher course attendance in the last 6 years; Medisave contributions (national medical savings scheme)	Workshop to Enhance the Safety of Crane Operation (WESCO) Certificate in the last 6 months
Feature predisposing for voluntary retirement	Yes (optional renewal after failing the on-road assessment, with no limit on the number of on-road retests)	Yes (optional renewal after failing the OTA, whether to proceed to the BCA for practical skills assessment)
Potential of bridge employment for retirees from other industries	Yes. A retiree with an ordinary driver's licence can apply to the LTA to obtain a new taxi driving licence.	No. Crane operation is a specialized skill within the construction industry.
Research on retrospective relicensing record data	Yes. Completed for 855 records (2014–2015). Outcome: refined protocol for evidence-based licensing as from mid-2020.	Yes. Ongoing for 192 records (2016–2019)

Note: LTA = Land Transport Authority; OTA = Occupational Therapy Assessment; BCA = Building Construction Authority.

2. Relicenisng Practices of Taxi Drivers Aged ≥ 70 Years in Singapore

The background of the taxi industry followed by a description of the relicensing practice according to the standard LTA relicensing form for taxi drivers aged ≥ 70 years, comprising the medical and driving fitness screenings, will be presented. The rationale for its practices and subsequent changes after 2006 will also be outlined, in particular with regards to the landmark national database study of older taxi drivers (2014–2015) that provided an evidence-based revision of the relicensing policy in mid-2020.

2.1. Background of the Taxi Industry

The local taxi industry is a protected one, restricted only to Singaporean citizens aged ≥ 30 years. A comparative study on licensing policies for taxi drivers showed Singapore as having an older age entry at 30 years and mandatory retirement age policy that are different from Australia and Hong Kong (Chan et al. 2010b). Local studies have consistently shown

older taxi drivers aged ≥ 70 years to be male workers (Chan et al. 2010a, 2018; Chan 2012), although there are some female taxi drivers in the younger workforce.

Taxi drivers are classified as self-employed workers. Not all licensed taxi drivers are actively taxi driving. Those who are will either be hirer taxi drivers (hiring a taxi directly from a taxi operator company) or work as relief drivers (partnering with hirer taxi drivers). Hirer taxi drivers can choose to be sole taxi drivers or work a 12-h shift with their relief taxi drivers to share the daily hiring cost of the taxi vehicle. Inactive licensed taxi drivers are generally in the younger age group who have other forms of full-time employment. These tend to renew their taxi licences until the mandatory retirement age if they can.

A valid taxi driving licence is perceived as a valuable asset. It provides a form of self-employment for those with a low level of education and access to a motor vehicle when not taxi driving (Chan 2012). It is also a resource for alternative self-employment. This is pertinent in an older male workforce, whereby the traditional Asian identity of men being the main breadwinners in families still holds (Chan 2012). Semi-skilled, low-wage earners may need to supplement their primary source of income by taxi driving outside normal working hours. In mid-life workers, a valid taxi driver licence is a safety net to earn an income if they are retrenched during any economic downturns and unable to be reemployed. In older retiring workers, taxi driving is an accessible source of bridge employment, without physical demands and driving around in an air-conditioned vehicle. Bridge employment can be viewed as a form of partial retirement in terms of reduced working hours in the same or different type of work from the previous career or any paid work after retirement before total exit from the workforce (Beehr and Bennett 2015).

2.2. The Relicensing Practice of Older Taxi Drivers Aged ≥ 70 Years in 2006

The licensing policy for taxi drivers stipulates regular renewal based on passing a standard medical fitness screening every two years from ages 50–64 years and annually from 65 years (Singapore Medical Association 2011). In the 1970s, the age limit for taxi driving was set by LTA to be 70 years old. During the national election year of 2006, timely lobbying from older taxi drivers led to the extension of the age limit to 73 years, alongside stricter relicensing criteria by the LTA (Chan et al. 2010a).

Several months prior to the onset of ≥70 years of age, the LTA will send a cover letter and a hard copy of its relicensing form (*Assessment on Fitness to Drive for Taxi Drivers Aged 70 years and above*) to an older taxi driver. If the older taxi driver opts to renew his taxi licence, he must first visit a community doctor of his choice (Chan et al. 2010a). The applicant discloses personal particulars, including information on the different types of vocational licences held and any relevant history of driving-related incidents. Then he signs the form, as witnessed by the doctor, to give (i) a true and accurate self-declaration, with risk of licence revocation in any willful suppression of information, and (ii) consent to the doctor to communicate with other doctors who had attended to him previously. Subsequently, the medical fitness screening commences.

2.2.1. Medical Fitness Screening

During the medical screening, the doctor obtains a self-reported history of any problems related to various body systems (cardiac/pulmonary, neuro and musculoskeletal, vision/hearing, endocrine and others not mentioned) by a 'yes' or 'no' response from the applicant. Then he conducts various tests of vision (colour perception, visual acuity, near vision, visual field) and a 13-item general medical examination (general condition, cardiovascular system, lungs, abdomen, neuromuscular system, noting any abnormalities, evidence of any psychiatric disorder, hearing defect, observable physical deformities or disabilities, limitations in limbs, finger–nose coordination test and dependency/addiction on alcohol/drug). Lastly, he administers the 10-item Abbreviated Mental Status Test [AMT] (Sahadevan et al. 2000) to screen cognitive impairment. If the AMT score is below seven points, suggestive of cognitive impairment, the doctor is to refer the applicant for specialist attention.

The doctor concludes the medical examination screening by certifying if the applicant is (i) fit and can proceed for the OT assessment or (ii) unfit, without the need to proceed for the OT assessment. The completed form is returned directly to the applicant by the doctor, without the need of either party to notify the LTA of the outcome of the medical fitness screening. The applicant who has been certified medically fit proceeds to book for the driving fitness screening at a designated hospital.

2.2.2. Driving Fitness Screening

Driving a motor vehicle is a multi-dimensional practical task involving the integration of various functions (visual, cognitive, perceptual, motor coordination) to maneuver a vehicle safely in a dynamic road situation. The driving fitness screening at the designated hospital comprises an off-road clinic assessment (15 min), followed by an on-road driving assessment (30 min) on the same visit.

In the off-road clinic assessment, the applicant is administered various subtests to assess cognition, perception and motor coordination using the Colour Trails Test (Part B) (CTT-B) (D'Elia et al. 1996), Motor-Free Visual Perceptual Test (MVPT-3) (Colarusso and Hammill 2003) and Rapid Walk Test (RWT) (Marottoli et al. 1994), respectively. Results of these subtests are filled into the form before the applicant automatically proceeds to do the on-road assessment. In the on-road assessment, the applicant drives a motor vehicle of his preference (automatic or manual) provided by the assessment site on a directed, standard route. The driving performance of the applicant is rated pass/fail on each of the 22-item on-road checklist, as assessed by both a driving instructor and a driver-assessor OT present in the vehicle. A pass in all of the 22-items of the on-road checklist is needed to pass the on-road assessment to qualify for fitness to hold a taxi licence. All fully completed relicensing forms are then mailed directly by the driving assessment site to the LTA for final processing.

The LTA will check that other pre-requisites are also met prior to renewal. These include having attended a taxi driver refresher course in the last six years and payment of compulsory Medisave contributions for self-employed workers into the Central Provident Fund (Chan et al. 2010a, 2010b). Medisave is a national medical savings scheme that helps Central Provident Fund members save for future healthcare needs for themselves or approved dependents (Central Provident Fund n.d.).

An applicant who fails the first on-road assessment is allowed to repeat this component on another pre-booked day, without a limit to the number of such attempts (Chan et al. 2010a). Indirectly, this facilitates a process for the weak performing taxi driver to opt for voluntary driver retirement eventually. The repeated on-road driving failures would increase self-awareness of persistent deficits in driving skills and the increasing out-of-pocket expenses arising from retests. These become push factors over time for voluntary driver retirement to mitigate against delaying driver retirement and minimizing the negative impact of forced licence cancellation (Chan 2012).

2.3. The Relicensing Practice of Older Taxi Drivers Aged ≥ 70 Years from 2012 and 2014

In 2012, active lobbying by older taxi drivers to extend the retirement age limit resumed during the election year of a new President. This was anticipated as taxi driving provided a meaningful form of active ageing for older taxi drivers (Chan 2012; Chan et al. 2014; Lai 2014). In response to this lobbying, the LTA raised the mandatory retirement age limit from 73 years to 75 years but with the requirements of passing functional driving assessments at the designated site during renewal at 73 and 74 years of age if the driver is deemed medically fit to renew.

In 2012, the off-road assessments were strengthened to include the contrast sensitivity test (Melbourne Edge Test) (Haymes and Chen 2005) to supplement the visual acuity tests conducted by the doctors, following an evidence-based review of literature on older drivers and licensing policies (Chan et al. 2010b). If an applicant could not improve his contrast sensitivity with a new pair of glasses, he would be referred by the OT to see

an ophthalmologist. The applicant can re-apply for licence renewal following any later successful corrective eye intervention.

In 2014, following discussion with an Occupational Medicine doctor from MOM, the MVPT for perceptual function screening was replaced by a 3-D block copying subtest (Whiting et al. 1985) as it was deemed to be a more relevant instrument. The MVPT relied on identifying a series of 2-D pictures, whilst the 3-D block copying subtest (Whiting et al. 1985) involved visual perceptual and motor construction abilities that was more representative of driving abilities in the real-world environment.

2.4. The Relicensing Practice of Older Taxi Drivers Aged ≥ 70 Years from Mid-2020

A major shift in the relicensing practice occurred in July 2020, when LTA incorporated approved research findings and recommendations from a retrospective study of the national database of 855 older taxi drivers' relicensing records from April 2014 to April 2015 (Chan et al. 2018, 2019). In this new model, the involvement of OTs was removed altogether. The On-road assessment was revised to be conducted by designated driving instructors at various driving schools. These driving instructors had been trained to use the 22-item on-road checklist in May 2020 to assess the driving performance of applicants on standard test routes set by the traffic police.

The National Database Study of Older Taxi Drivers 2014–2015

In the study by Chan et al. (2018), medically fit older taxi drivers aged ≥ 70 years had shown a high pass rate (98%) in driving fitness screening to renew their licences. This was consistent with a previous local study on a smaller cohort (Chan et al. 2010a). Notably, the study found no relationship between medical conditions and driving outcomes (Chan et al. 2019), as well as no relationship between off-road screening tests and on-road outcomes (Chan et al. 2018). The latter indicated no usefulness in the off-road assessments administered by the OTs in the relicensing practice. The findings demonstrated that the older taxi drivers had no health- or age-related functional impairments in their driving skills (Chan et al. 2018), even if they had a few chronic medical conditions (Chan et al. 2019). In fact, 31% of the sample had no medical conditions, with the remaining having one (36%) and two (24%) medical conditions. Findings indicated that a diagnosis alone does not necessarily imply impaired driving skills, as had been highlighted by Classen et al. (2008) given the interplay of other factors, e.g., the severity of illness or the effect of treatment. Interestingly, predictors of driving performance in the relicensing practice were related positively to age and years of taxi driving (≥20 years) (Chan et al. 2019).

Further analysis of the reasons for failure in the first on-road assessment showed the most common error to be in the performance of an illegal U-turn (67%) at the end of the route. However, most taxi drivers passed on the next on-road test without repeating the error. Reasons for committing the illegal U-turn could be due to several factors. Anxiety in a testing situation, combined with an atypical location of the U-turn, possible risk-behaviour personality trait and/or inadequate knowledge of road regulations, could have predisposed the driver to make a wrong judgement and decision (Chan et al. 2018). The location of the legal U-turn was situated about 20m ahead of the gap that allowed access for emergency vehicles to reach a fire hydrant next to the tertiary hospital.

Overall, the findings by Chan et al. (2018, 2019) highlighted that older taxi drivers were competent drivers, and there was a lack of evidence to support the continued involvement of OTs in the relicensing practice. Failure in any on-road assessment was largely due to behavioural rather than health-related deficits of the drivers. Since older taxi drivers must pay out-of-pocket expenses for all relicensing costs, the off-road testing by OTs was not a justified service. In view of judicious use in limited healthcare manpower resources, the role of a specialist driver-assessor OT in the on-road component was also critiqued in the relicensing of medically fit clients. As an on-road assessment is accepted to be the gold standard for determining fitness to drive, especially in complex health cases (Chan et al. 2010b, 2019), it could still be retained in the relicensing practice but with the

use of non-healthcare professionals, e.g., driving instructors at driving schools, similar to the annual on-road assessment by traffic police for heavy vehicle drivers aged 65–75 years (Chan et al. 2018; Seow and Wei 2015).

3. Relicensing Practice of Older Crane Operators Aged ≥ 70 Years in Singapore

This section will give a brief introduction on the local crane operator industry regulated by the Ministry of Manpower (MOM) before describing in detail the more stringent relicensing practice for workers aged ≥ 70 years, in terms of the routine medical fitness screening and new occupational therapy assessment from 2016.

3.1. Background of the Crane Operator Industry

Crane operators are a critical manpower resource in the building and construction industry, engaged in the ongoing urbanization and transformation of Singapore into a modern, sustainable and liveable city nation (Urban Redevelopment Authority 2012). It is known that crane operation requires proficiency and competence in visual, perceptual, motor and cognitive skills (Fang and Cho 2016), similar to competent driving performance in a motor vehicle. In Singapore, there is no mandatory retirement age for crane operators.

The minimum age for a crane operator licence application is 21 years old (Ministry of Manpower n.d.). The Building Construction Authority (BCA) is the designated local training provider for four types of crane operator licences (crawler, mobile, tower/saddle jib, tower/luffing jib), regulated by the MOM. At stipulated renewal cycles, the crane operator has to obtain a valid new Workshop to Enhance the Safety of Crane Operation (WESCO) certificate at least 6 months prior to licence expiry (Ministry of Manpower n.d.). According to the local Workplace and Safety Health Act (Operation of Cranes) Regulations 2011 (Singapore Statutes Online n.d.), crane operators are mandated to declare any medical conditions that could compromise work performance.

In view of the ageing society, a review of its licensing policy occurred in 2016. From 1 April 2016, new applicants and existing crane operators aged ≥ 50 years had to undergo regular medical screenings with separate medical screening forms for those aged 50–69 years and ≥70 years, every two years and annually, respectively.

Current studies on crane operators are limited and from overseas. They focus on health-related aspects of crane operators in terms of work ergonomics (Essdai et al. 2018) and musculoskeletal disorders (e.g., discomfort and/or pain in the lower back, neck and shoulder regions) (Krishna et al. 2015; Ibrahim et al. 2020). There is a scarcity of literature on licensing policies of crane operators and on the older workforce aged ≥ 70 years.

According to preliminary findings of a local 4-year national database study on 192 relicensing records of those aged ≥ 70 years (2016–2019), this local older workforce comprises wholly of men (Chan 2020). The working hours of crane operators differ according to their contracts and the demands of the industry. As crane operation requires specialized training and adaptation to working demands in an outdoor construction environment, it is generally not a very attractive or suitable form of bridge employment for older workers outside the industry.

3.2. The Relicensing Practice of Older Crane Operators Aged ≥ 70 Years as from 2016

In 2016 the MOM introduced a stricter relicensing practice for crane operators aged ≥ 70 years by adapting the LTA model for older taxi drivers aged ≥ 70 years. After obtaining medical fitness clearance by community doctors of their choice, older crane operators had to pass annually the clinic OT off-road assessments at a designated site. Failure in passing the OT assessments would require the crane operator to undergo a practical crane operation assessment at the BCA if the crane operator wishes to persist in renewing his operating licence.

A few months before the age of ≥70 years, a crane operator would receive a cover letter and hardcopy of the Crane Operator Medical Examination Form B for Crane Operators aged 70 years and above from MOM. The crane operator is reminded in the cover letter

of the importance to hold a valid registered licence for his work: "*In accordance with the Workplace Safety and Health (Operations of Cranes) Regulations, no person shall operate a mobile or tower crane in a workplace unless he is a registered crane operator. Any person who contravenes this regulation shall be liable to a fine not exceeding $20,000 or imprisonment for a term not exceeding 2 years or both.*"

Before visiting a community doctor of his choice, the applicant fills in his personal particulars and work profile (types and total years of crane operation) on the relicensing form. Additionally, the applicant needs to fast 8 hours before the planned visit to the doctor and to abstain from any intake of diabetic medication on the day itself. At the clinic, the applicant formally acknowledges giving an accurate self-declaration as well as consent for communication between doctors to occur before undergoing the medical examination.

3.2.1. Medical Fitness Screening

This part of the protocol is broadly similar to the LTA model in terms of the subsections on self-reported medical history, medical examination and the AMT. Distinctively different is the need for the doctor to obtain blood samples for laboratory tests (fasting plasma glucose, basic lipid profile) and their results. The doctor is reminded to ensure (i) any diabetes is treated and stable before certification of fitness, according to the Singapore Medical Singapore Medical Association (2011), and (ii) any abnormal lipid profiles are managed and further evaluated with other cardiovascular risk factors to determine the risk for a cardiac event, according to the MOH Clinical Practice Guidelines 1/2011 on Screening for Cardiovascular Disease and Risk factors.

The doctor concludes the medical examination by summarizing the overall results to indicate if the applicant is fit or unfit to hold a certificate of registration to operate cranes. Medically fit crane operators are instructed to book for the Occupational Therapist Assessment at a designated assessment site. There is no requirement for either the doctor or applicant who failed the medical screening to update the MOM by returning the form.

3.2.2. Occupational Therapist Assessment

At the designated site, a driver-assessor OT administers the same battery of Off-road assessments (2014 LTA version for older taxi drivers) in terms of contrast sensitivity, RWT, 3-D construction test and CTT-2. However, an applicant needs to pass each of these tests according to specified cut-off scores as set by the MOM, to be certified fit for renewal. Otherwise, he is certified "*Fit on the condition that the crane operator passes the BCA on-site crane practical assessment*".

The completed form is sent directly by the designated site to the MOM for processing before the formal issue of license renewal, after ensuring compulsory attendance at the latest WESCO has also been met. The MOM would also follow up with any failed applicant if he would like to make arrangements and pay for the 8-hour practical test at the BCA. The failed applicant would be opting out for renewal if he does not go to the BCA for the extra testing. Indirectly, the additional cost and time to do the BCA test are push factors for optional work retirement for at-risk crane operators as identified by the occupational therapist assessment.

To date, this MOM relicensing practice of older crane operators since 2016 remains unchanged. Preliminary findings show a high pass rate (96%) in the occupational therapy assessment component in the relicensing practice of 192 medically fit older crane operators aged $\geq$ 70 years from the recent 4-year national database study; with two crane operators reportedly opting out of the BCA testing. Further data analysis of the relicensing records is ongoing by the Singapore Clinical Research Institute. It is hoped the final results will contribute to refining relicensing practice from an evidence-based perspective. A planned qualitative study investigating the retirement experience of older crane operators and to interview representatives of the Crane Operator Association and MOM to gain further insights into the local crane industry was disrupted by the Covid outbreak situation in 2020.

4. Summary

The key features of the innovative relicensing frameworks for older Singaporean taxi drivers and crane operators aged ≥ 70 years in the last two decades have been described. The earlier trend of policymakers to introduce a stricter tier of relicensing of medically fit older workers aged ≥ 70 years by incorporating additional functional fitness assessments by occupational therapists needs to be evaluated against relevant emerging research findings. Distinctively, recent evidence in the taxi industry has resulted in landmark changes of its relicensing policy for older taxi drivers aged ≥ 70 years in mid-2020. Policymakers need to actively engage in simultaneous, interdisciplinary research to benchmark existing and future relicensing policies for evidence-based practices. Indirectly, it contributes to better implementation of the national successful ageing agenda for all stakeholders (older workers, employers, health professionals, licensing authorities). Overall, this paper extends the existing body of literature to offer some insights to guide policymakers in other regions to navigate the relicensing landscape of similar older workers for active and successful ageing within their socio-cultural contexts.

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