Malnutrition and quality of life among Malaysian community-dwelling older persons during COVID-19 pandemic

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ABSTRACT

Introduction: The COVID-19 pandemic affected nutrition among older persons due to disruptions in food supply and shortages of essential medicines, supplements, and food, leading to malnutrition or unhealthy diets. While unhealthy body mass index (BMI) and malnutrition may influence quality of life (QoL), evidence is limited. This cross-sectional study aimed to determine the association between BMI and malnutrition towards QoL among older persons in Malaysia during the COVID-19 pandemic. **Methods:** Data were obtained through an online questionnaire consisting of self-reported anthropometry, malnutrition assessment using the Malnutrition Risk Screening Tool-Hospital (MRST-H) and Mini Nutritional Assessment-Short Form (MNA-SF), and the Short Form-36 Health Survey (SF-36) for QoL evaluation. **Results:** A total of 169 respondents [median age = 64.0 (62.0, 69.5) years], with a mean BMI of 25.5±4.9 kg/m², participated in the study. Prevalence of malnutrition was 4.2% based on MNA-SF; 30.2% and 33.1% of respondents were identified as being at high risk of malnutrition according to MNA-SF and MRST-H, respectively. Median score for QoL was 61.1±27.0, indicating good QoL. No significant association was found between BMI and QoL. Higher MNA-SF scores, indicating better nutritional status, were associated with higher QoL. Higher MRST-H scores, indicating higher malnutrition risk, were significantly associated with lower social functioning in QoL. **Conclusion:** Addressing malnutrition in older persons is crucial, as it significantly impacts their QoL, especially in the social functioning domain. However, it is still unclear whether malnutrition is a cause or an effect, or perhaps a third potential factor, such as functional status, which acts as a mediator.

Keywords: body mass index, malnutrition, older persons, quality of life

INTRODUCTION

The COVID-19 pandemic has significantly affected older persons worldwide, causing fear and suffering in several aspects of life. While public measures like movement restrictions and social distancing helped control the spread of the virus, their impact on the

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quality of life (QoL) among older persons remains a concern. The pandemic negatively impacted the nutritional status of older persons due to food supply disruption, lack of necessities (e.g., medicines, supplements, and healthy foods), and increased consumption of unhealthy foods (Huizar *et al.*, 2020). It also impacted the global food supply chain by hindering the exportation of food items, creating labour shortages in food production, and triggering panic buying and stockpiling (Kakaei *et al.*, 2022). Socioeconomic insecurity affected food intake and the need for support in daily tasks and meals, with some older persons relying on food donations due to the economic crisis caused by the COVID-19 pandemic (Kakaei *et al.*, 2022). Additionally, ageing alters nutritional needs and eating habits, making older persons more reliant on specific foods to maintain health.

The global older population is emerging due to increasing life expectancy; the proportion of people above 60 years old is expected to double from 11% to 22% in the 21st century (Hamza *et al.*, 2018). Although a longer life span is desirable, living with a good QoL is also important (Hamza *et al.*, 2018). Some studies carried out during the COVID-19 pandemic have reported the worsening of QoL among older persons (Aravindhan *et al.*, 2022). This information highlights the importance of assessing QoL to help identify areas for improving the life quality of the older population, especially during the pandemic. Enhancing QoL among older people is one of the public health challenges of the 21st century (Onunkwor *et al.*, 2016). Therefore, gathering information regarding associated factors of QoL among older persons can contribute to its enhancement.

Nutritional status is a modifiable factor of QoL in older people, affecting physical function, cognitive performance, and emotional well-being (Khatami *et al.*, 2020; Maseda *et al.*, 2017). Assessing nutritional status is important for early detection of impaired nutrition among older persons, which can reduce caregivers' burden and avoid future economic costs to the society (Hamza *et al.*, 2018). Adequate nutrition preserves muscle mass and immunity, thus delaying age-related frailty and functional dependency. Even though underweight, overweight, obesity, and malnutrition have been associated with poor QoL among older persons in previous studies (Abdollahi *et al.*, 2016; Khatami *et al.*, 2020; You *et al.*, 2018), the nature of these associations is not fully understood. Previous studies from various countries reported that underweight and malnourished older persons have poorer QoL (Khatami *et al.*, 2020; Nur Kamilah *et al.*, 2023; You *et al.*, 2018), highlighting the importance of preventing these conditions. Moreover, while body mass index (BMI) is commonly used to assess nutritional status, it may not fully capture the age-related changes in body composition; thus, additional tools are necessary to ensure a more comprehensive evaluation.

In Malaysia, there is limited research assessing the QoL and its associated factors among older persons, especially during the COVID-19 pandemic. Studies involving QoL among older persons are necessary, as they can provide critical insights into the effectiveness of health interventions, welfare programmes, and overall well-being (Onunkwor *et al.*, 2016). Thus, this study aimed to determine the associations between BMI, malnutrition, and QoL among older persons living in Malaysia during the COVID-19 pandemic.

METHODOLOGY

This cross-sectional study assesses the associations between BMI, malnutrition,

and QoL among older persons across all states in Malaysia from February to July 2021. This study was approved by the University of Sultan Zainal Abidin Human Resource and Ethics Committee (UniSZA/UHREC/2121/222). Informed consent was obtained from all respondents through signed consent forms and they were assured of full confidentiality.

Respondents

Older persons aged ≥60 years living in Malaysia, regardless of ethnicity, were recruited in this study. Those who were unable to complete the questionnaire due to severe dementia, physical and cognitive impairments, or Down syndrome were excluded from this study. Respondents were recruited through an online survey distributed via social media networks, including email invitations, Facebook, and WhatsApp. Respondents were then assessed using a standardised online questionnaire comprising socio-demographic information, chronic diseases, self-reported anthropometric measurements (including weight, height, and BMI), nutritional status, and QoL. For older persons who were illiterate and unable to use smartphones or the internet, the online survey was completed with the help of their caretaker.

Sample size estimation

Sample size estimation was calculated using G*Power (Version 3.1.9.4), applying a priori analysis for simple linear regression with one predictor. Assuming a medium effect size (f^2=0.15), a significance level of 0.05, and a power of 0.80, a minimum of 55 participants was required for this study. Accounting for an expected non-response rate of 10%, the final sample size was 61 participants. However, a total of 169 older persons were recruited in this study.

Measurements

A standardised online questionnaire was used to assess the socio-demographic information, anthropometric measurements, nutritional status, and QoL of older persons, as detailed below.

Assessment of nutritional status

BMI, Malnutrition Risk Screening Tool-Hospital (MRST-H), and Mini Nutritional Assessment-Short Form (MNA-SF) were utilised in this study to evaluate the nutritional status and malnutrition risk among respondents. While BMI acts as a general anthropometric indicator, MRST-H and MNA-SF offer broader insights into the clinical and functional aspects that facilitate a multi-dimensional assessment of malnutrition. The MNA-SF emphasises clinical and functional aspects, whereas the MRST-H includes financial and culturally relevant factors specific to the Malaysian context. By combining these tools, it may help capture a wider spectrum of nutritional risk factors, thus improving the sensitivity and specificity of malnutrition detection.

MNA-SF and MRST-H were originally developed to be administered by healthcare professionals. However, due to the restrictions imposed by the COVID-19 pandemic, the respondents, with the assistance of their caregivers, had to self-administer the questionnaires. This approach was necessary to reduce face-to-face interactions and ensure the safety of the respondents. This self-administered MNA-SF approach among community-dwelling older people was supported by Donini *et al.* (2018). Their study findings showed a high completion rate of 94.7% and moderate agreement with healthcare-administered tools, with acceptable sensitivity and specificity levels. In the same study, the tool was completed by older individuals or their caregivers without professional assistance, even for

selected anthropometric measurements such as weight loss, mid-upper arm circumference (MUAC) and calf circumference (CC). Thus, these support the feasibility and validity of the use of self-administered tools such as MNA-SF and MRST-H in community settings, particularly during pandemic situations that limit direct engagement.

A self-administered questionnaire was used to collect the respondents' self-reported weight and height to calculate BMI. Despite potential bias from under-reporting weight and over-reporting height due to age-related height loss, a French study has validated the accuracy of self-reported data. The French study found high validity in web-based self-reports compared to clinical measurements, with an intraclass correlation coefficient (ICC) ranging from 0.94 for height to 0.99 for weight (Lassale *et al.*, 2013). Thus, self-reported anthropometric measurements are a valid alternative for the older population, especially when direct measurements are impractical and not feasible, such as during the COVID-19 pandemic. BMI was categorised according to the cut-off points recommended by the Nutrition Screening Initiative (NSI): underweight with a BMI <22.0 kg/m², normal weight between 22.0-27.0 kg/m², and overweight with a BMI >27.0 kg/m² (Barrocas *et al.*, 1996). These cut-off values for older persons were used because older people are more likely to experience high mortality rates due to higher BMI values and lower muscle mass, which have been shown in several longitudinal studies (Raguso *et al.*, 2006).

A validated Malay version of the MRST-H was used to assess the malnutrition risk of older persons in this study (Sakinah *et al.*, 2012). The MRST-H evaluates five key risk factors: MUAC, CC, financial dependency, feeding dependency, and unintentional weight loss. Gender-specific cut-off points for MUAC and CC were used to identify muscle wasting and malnutrition. Respondents scoring ≥2 on the MRST-H were classified as having a high risk for malnutrition, while those scoring <2 were considered to have a low risk. The MRST-H scale has demonstrated excellent accuracy in identifying malnutrition, with an area under the curve (AUC) of 0.84 when validated against the Subjective Global Assessment (Tan *et al.*, 2016).

Another nutritional screening tool used was the validated MNA-SF (Kaiser *et al.*, 2009), which includes six questions covering BMI, reduced food intake, weight loss in the past three months, mobility, acute illness or psychological stress, and neuropsychological issues. The responses were summed to give a total score ranging from 0 to 14. Scores of 12-14 indicated normal nutritional status, scores of 8-11 suggested a risk of malnutrition, and scores ≤7 indicated malnutrition (Kaiser *et al.*, 2009).

Assessment of health-related quality of life (SF-36)
The SF-36 is a short-form questionnaire used to assess QoL, encompassing 36 items across eight subscales: physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role limitations due to emotional problems (RE), and mental health (MH). These subscales were further categorised into two summary measures: the physical component summary (PCS) (21 items: PF, RP, BP, GH) and the mental component summary (MCS) (14 items: VT, SF, RE, MH). Each item was scored on a scale from zero to 100, with higher scores indicating better QoL. The reliability of all eight SF-36 domains was confirmed, with Cronbach's alpha coefficients ranging from 0.70 to 0.98, meeting or

exceeding the minimum standard for internal consistency (Sakinah & Tan, 2020).

Statistical analysis

Data were analysed using the IBM-SPSS version 21.0 (SPSS, Inc., Chicago, IL, USA). Kolmogorov-Smirnov test was utilised to assess normality. Descriptive statistics were employed to analyse socio-demographic characteristics and determine their frequencies. Mann-Whitney test was applied to evaluate the differences in means of age between genders. Additionally, simple linear regression was performed to separately examine the relationship between BMI and QoL, as well as between malnutrition status and QoL among respondents. BMI and malnutrition scores were not included simultaneously in the same model to avoid potential multicollinearity arising from their strong correlation. The associations were reported as beta coefficients (ß), with corresponding 95% confidence intervals. Statistical significance was determined using a two-tailed *p*-value of <0.05.

RESULTS

The total number of respondents involved in this study was 169 older persons, with a median age of 64.0 (62.0, 69.5) years. Most of the respondents were females (58.0%), as compared to males (42.0%). Less than half of the respondents reported the absence of chronic diseases (43.2%), while other respondents had chronic diseases; 37.9% had one chronic disease and 19.0% had two or more types of chronic diseases (Table 1).

Nutritional status

Table 2 presents the BMI and malnutrition status among respondents, according to MRST-H and MNA-SF, categorised by gender. Based on self-reported data, the mean BMI value of respondents was 25.5±4.9 kg/m². According to NSI classification, the majority of respondents had normal weight (43.8%), followed by overweight (34.3%) and underweight (21.9%). The majority of female respondents had a normal weight (44.9%) compared to males (42.3%) (Table 2). According to MRST-H, the majority of respondents had normal nutritional status (66.9%), while others (33.1%) were reported to be at risk of malnutrition, with more females (39.8%) than males (23.9%). Similarly, the MNA-SF indicated that most of the respondents had normal nutritional status (65.7%), followed by at risk of malnutrition (30.2%) and malnutrition (4.1%).

Quality of life status

Median scores of QoL among respondents are presented in Table 3. Overall, the total median score of QoL was 61.1 (49.3, 76.4). The physical role domain and vitality domain had the lowest median scores, which were 56.3 (34.4, 75.0) and 56.3 (50.0, 65.6), respectively. Meanwhile, of all the domains of QoL, the social functioning domain was reported to have the highest score of 75.0 (50.0, 87.5).

Associations between BMI, nutritional status, and QoL

Associations between BMI, MRST-H, MNA-SF scores, and QoL are shown in Table 4. This study revealed that BMI was not significantly associated with all the domains of QoL, PCS, MCS, and total QoL scores (*p*>0.05). Although the associations were not significant, the results indicated that people with a high BMI may have lower scores for PCS. Additionally, the MCS scores may be higher for people with a high BMI.

Based on MRST-H, the results revealed that MRST-H scores were not significantly associated with PCS, MCS, total QoL scores, and all QoL domains

Table 1. Socio-demographic characteristics of respondents (*N*=169)

Characteristics	n (%)			p-value†
	Men (n=71)	Women (n=98)	Total (n=169)	
Age (years), Median (IQR)	65.0 (61.0, 69.0)	64.0 (62.0, 70.5)	64.0 (62.0, 69.5)	0.934
Age (years), *n* (%)				
60-69	55 (77.5)	72(73.5)	127 (75.1)	
70-79	14 (19.7)	20 (20.4)	34 (20.1)	
80-89	2 (2.8)	4 (4.1)	6 (3.6)	
90-99	0 (0.0)	2 (2.0)	2 (1.2)	
Ethnicity				
Others	3 (4.2)	4 (4.0)	7 (4.2)	
Malay	68 (95.8)	94 (95.9)	162 (95.9)	
Marital status				
Divorced	1 (1.4)	1 (1.0)	2 (1.2)	
Married	58 (81.7)	51 (52.0)	109 (64.5)	
Single	7 (9.9)	13 (13.3)	20 (11.8)	
Widowed	5 (7.0)	33 (33.7)	38 (22.5)	
Religion				
Christianity	2 (2.8)	2 (2.0)	4 (2.4)	
Hinduism	1 (1.4)	0 (0.0)	1 (0.6)	
Islam	68 (95.8)	96 (98.0)	164 (97.0)	
States				
Johor	1 (1.4)	4 (4.1)	5 (3.0)	
Kedah	0 (0.0)	5 (5.1)	5 (3.0)	
Kelantan	6 (8.5)	6 (6.1)	12 (7.1)	
Melaka	3 (4.2)	3 (3.1)	6 (3.6)	
Negeri Sembilan	0 (0.0)	3 (3.1)	3 (1.8)	
Pahang	6 (8.5)	2 (2.0)	8 (4.7)	
Perak	2 (2.8)	1 (1.0)	3 (1.8)	
Perlis	0 (0.0)	1 (1.0)	1 (0.6)	
Pulau Pinang	2 (2.8)	2 (2.0)	4 (2.4)	
Sabah	0 (0.0)	22 (2.0)	2 (1.2)	
Selangor	4 (5.6)	6 (6.1)	10 (5.9)	
Terengganu	44 (62.0)	59 (60.2)	103 (60.9)	
Wilayah Persekutuan	3 (4.2)	4 (4.1)	7 (4.1)	
Number of chronic diseases				
None	33 (46.5)	40 (40.8)	73 (43.2)	
One	25 (35.2)	39 (39.8)	64 (37.9)	
Two or more	13 (18.3)	19 (19.3)	32 (19.0)	

IQR: Interquartile range
†Mann-Whitney Test was applied

except for the social functioning domain (*p*=0.042). Higher scores of MRST-H, indicating a higher risk of malnutrition, were associated with lower social functioning of QoL. MNA-SF scores had significant positive associations with PCS, MCS, total QoL scores, and all QoL domains (*p*<0.001), particularly in the emotional role. Higher scores of MNA-SF, indicative of better nutritional

Table 2. Body mass index (BMI) and malnutrition status of respondents based on MRST-H and MNA-SF according to gender

Characteristics	n (%)		
	Men (n=71)	Women (n=98)	Total (n=169)
BMI (Mean±SD)	25.3±4.2	25.7±5.3	25.5±4.9
Underweight (<22.0 kg/m^2)	17 (23.9)	20 (20.4)	37 (21.9)
Normal weight (22.0-27.0 kg/m^2)	30 (42.3)	44 (44.9)	74 (43.8)
Overweight (>27.0 kg/m^2)	24 (33.8)	34 (34.7)	58 (34.3)
MRST-H			
Normal nutritional status	54 (76.1)	59 (60.2)	113 (66.9)
At high risk of malnutrition	17 (23.9)	39 (39.8)	56.0 (33.1)
MNA-SF			
Normal nutritional status	50 (70.4)	61 (62.2)	111 (65.7)
At risk of malnutrition	18 (25.4)	33 (33.7)	51 (30.2)
Malnutrition	3 (4.2)	4 (4.1)	7 (4.1)

MRST-H: Malnutrition Risk Screening Tool-Hospital; MNA-SF: Mini Nutritional Assessment-Short Form; BMI cut-off points according to Nutrition Screening Initiative: Underweight (<22.0 kg/m^2), normal (22.0-27.0 kg/m^2), overweight (>27.0 kg/m^2); classification of MRST-H according to Sakinah *et al.* (2016): At high risk of malnutrition (≥2); classification of MNA-SF according to Kaiser *et al.* (2009): Normal nutritional status (12-14), at risk of malnutrition (8-11), malnutrition (0-7)

status, were associated with higher QoL. In other words, malnutrition was negatively associated with QoL in all domains of QoL.

DISCUSSION

This study showed that older persons experiencing malnutrition or at risk of malnutrition were associated with poor physical and mental components of QoL. Findings of this study concluded that older persons had poor QoL, specifically in the physical role and vitality domains. Meanwhile, good QoL was reported in the social functioning domain. Similarly, a study conducted by Khatami *et al.* (2020) reported poor physical role and vitality domains of QoL among older people with normal nutritional status; however, deterioration in these domains has been shown among those with malnutrition. Another study conducted among older Brazilians supported the results of the present study, in which it discovered that the vitality domain had the lowest score, while social functioning had the highest score (Lima *et al.*, 2009). Based on another previous study, it explained that the older population have less muscular mass and strength than those of other age groups, thus leading to low vitality (Witard *et al.*, 2016).

Furthermore, this present study showed that overweight older persons reported having poor physical but high mental component domains of QoL. However, there was no significant association between BMI and QoL. This finding is consistent with a study conducted in Korea, which also reported no association between BMI and QoL among older persons, as assessed by SF-36 scores (Lee *et al.*, 2017). In contrast, findings from other studies contradicted those of the present study. For instance, several previous studies found a significant association between high BMI and low QoL among the older population (Abdollahi *et al.*, 2016; Rambod, Ghodsbin & Moradi, 2020).

Table 3. Quality of Life (QoL) and its domains among respondents (*N*=169)

Characteristics	Median (IQR)
QoL domains	
Physical component summary (PCS)	59.4 (45.3, 73.6)
PF	60.0 (40.0, 80.0)
RP	56.3 (34.4, 75.0)
BP	65.0 (45.0, 77.5)
GH	60.0 (48.0, 70.0)
Mental component summary (MCS)	64.4 (50.0, 78.4)
VT	56.3 (50.0, 65.6)
SF	75.0 (50.0, 87.5)
RE	66.7 (33.3, 100.0)
MH	70.0 (50.0, 80.0)
Total QoL	61.1 (49.3, 76.4)

PF: physical functioning; RP: role limitations due to physical problems; BP: bodily pain; GH: general health; VT: vitality; SF: social functioning; RE: role limitations due to emotional problems; MH: mental health

The inconsistency of results from this study compared to previous studies may be due to the COVID-19 situation, where the pandemic has contributed to unhealthy lifestyle changes among older adults, including reduced physical activity and increased snacking, leading to weight gain and elevating the risk of overnutrition or overweight (Silverio *et al.*, 2021; Visser, Schaap & Wijnhoven, 2020). This may explain why the prevalence of overweight was relatively high in this study. Furthermore, the discrepancy between current and previous findings may be explained by other factors influencing QoL, including co-morbidities, mental health status, social support, and perceived health in the study population. Lastly, the limited BMI variability range of respondents and the small sample size in this study may have impacted the ability to detect significant associations. Thus, this highlights the need for more comprehensive and multidimensional assessment approaches in geriatric populations.

This study reported that the prevalence of malnutrition among older persons was low (4.1% based on MNA-SF). Meanwhile, 33.1% of the older persons were reported as being at risk of malnutrition according to MRST-H. In comparison to the prevalence of malnutrition among older persons in Malaysia, as reported by the National Health and Morbidity Survey 2018 (Ahmad *et al.*, 2021) at 7.3%, the prevalence observed in this study conducted during the COVID-19 pandemic in 2020 was slightly lower. In Sri Lanka, a study found that 12.5% of older persons were malnourished (Damayanthi *et al.*, 2018), while a study in Singapore reported a much lower prevalence of 2.8%. This suggests that Singapore's lower proportion of malnutrition compared to Malaysia and Sri Lanka is likely due to its status as a developed country, with urbanised areas and better access to health services.

In contrast to the findings of this study, a study conducted among Dutch older persons who lived independently found that the COVID-19 pandemic negatively impacted the nutrition of older persons (Visser *et al.*, 2020). This aligns with concerns about increased risk of malnutrition among older persons, as the pandemic negatively impacted

Table 4. Associations between body mass index (BMI), MRST-H scores, MNA-SF scores, and QoL among respondents

Characteristics	QoL	B (95% CI)	t-statistics	p-value[†]	R²
BMI	PCS	-0.283(-0.855,0.289)	-0.978	0.330	0.006
	PF	-0.664 (-1.505,0.176)	-1.560	0.121	0.014
	RP	-0.209 (-1.108,0.689)	-0.460	0.646	0.001
	BP	-0.160 (-0.776,0.456)	-0.514	0.608	0.002
	GH	-0.099 (-0.686,0.428)	-0.370	0.712	0.001
	MCS	0.247 (-0.302, 0.797)	0.888	0.376	0.005
	VT	0.046 (-0.444,0.537)	0.187	0.852	<0.001
	SF	0.303 (-0.347,0.953)	0.920	0.359	0.005
	RE	0.412 (-0.576,1.400)	0.824	0.411	0.004
	MH	0.226 (-0.308,0.760)	0.836	0.404	0.004
	Total QoL	-0.018 (-0.551,0.515)	-0.067	0.947	<0.001
MRST-H scores	PCS	-1.429 (-3.136,0.227)	-1.653	0.100	0.016
	PF	-2.162 (-4.682,0.357)	-1.694	0.092	0.017
	RP	-0.812 (-3.508,1.884)	-0.595	0.553	0.002
	BP	-1.218 (-3.058, 0.623)	-1.306	0.193	0.010
	GH	-1.1525 (3.091,0.041)	-0.147	0.056	0.022
	MCS	-1.481 (-3.117,0.156)	-1.786	0.076	0.019
	VT	-1.121 (-2.583,0.341)	-1.514	0.132	0.014
	SF	-2.006 (-3.938, 0.074)	-2.050	0.042*	0.025
	RE	-1.685 (-4.664, 1.273)	-1.125	0.262	0.008
	MH	-1.109 (-2.705, 0.487)	-1.371	0.172	0.011
	Total QoL	-1.454 (-3.038, 0.131)	-1.812	0.072	0.019
MNA-SF scores	PCS	3.716 (2.509, 5.017)	5.917	<0.001***	0.173
	PF	4.984 (3.093,6.875)	5.203	<0.001***	0.139
	RP	4.406 (2.348,6.463)	4.227	<0.001***	0.097
	BP	2.816 (1.396,4.237)	3.915	<0.001***	0.084
	GH	2.840 (1.646,4.033)	4.697	<0.001***	0.117
	MCS	3.860 (2.678, 5.048)	6.419	<0.001***	0.198
	VT	2.978 (1.888,4.068)	5.395	<0.001***	0.148
	SF	4.529 (3.120, 5.937)	6.347	<0.001***	0.194
	RE	5.087 (2.835,7.340)	4.459	<0.001***	0.106
	MH	2.850 (1.638,4.063)	4.643	<0.001***	0.114
	Total QoL	3.812 (2.668, 4.956)	6.580	<0.001***	0.206

MRST-H: Malnutrition Risk Screening Tool-Hospital; MNA-SF: Mini Nutritional Assessment-Short Form; QoL: Quality of life; PCS: Physical component summary; PF: physical functioning; RP: role limitations due to physical problems; BP: bodily pain; GH: general health; MCS: Mental component summary; VT: vitality; SF: social functioning; RE: role limitations due to emotional problems; MH: mental health
[†]Simple linear regression was applied
*significant at $p<0.05$; **significant at $p<0.01$; ***significant at $p<0.001$

dietary habits and lifestyle parameters, particularly through social isolation and quarantine (Silverio *et al.*, 2021). Public health measures, including social distancing and home confinement, further reduced physical activity and food consumption due to limited food availability (Silverio *et al.*, 2021). Older

persons also faced decreased support in cooking and shopping, which negatively impacted their energy intake and variability of daily diet. Additionally, older persons may have experienced a decrease in appetite caused by decreased physical activity levels, eating alone, and feeling stressed and anxious because of their vulnerability to COVID-19 infection and its complications (Visser *et al.*, 2020). Thus, crisis events such as the COVID-19 pandemic have affected the daily activities of older persons, causing them to experience emotional disruption, physical inactivity, and malnutrition.

This study demonstrated a negative association between malnutrition based on MNA-SF scoring and QoL. The findings strongly align with numerous previous studies that also discovered a negative association between malnutrition and QoL among the older population (Damião *et al.*, 2018; Hamza *et al.*, 2018), thereby providing robust support for this result. A meta-analysis indicated that malnourished older individuals face a greater risk of experiencing poor QoL. However, interventions aimed at improving their nutritional status have been shown to enhance their mental and physical QoLs (Rasheed & Woods, 2013), suggesting that nutritional interventions can significantly benefit this population. Given the complex relationship between nutritional status and QoL, which includes factors such as mood, physical health, social interactions, and eating difficulties, a comprehensive approach is essential for effectively tackling malnutrition.

Based on the MRST-H scores, there was a significant relationship between higher MRST-H scores and lower QoL in the social functioning domain. Higher MRST-H scores indicate poor nutritional status and a high risk of malnutrition. Similarly, previous studies have also shown that older persons at high risk of malnutrition have lower QoL in the social

functioning domain (Acar Tek & Karacil-Ermumcu, 2018; Maseda *et al.*, 2017). Social functioning refers to the ability of an individual to interact effectively, maintain interpersonal relationships, conduct daily activities independently, and participate in any work (Brissos *et al.*, 2011). Older persons at risk of malnutrition may score lower in social functioning due to their limitations in engaging with their social environment and interacting with others effectively due to their poor nutritional status (Maseda *et al.*, 2017).

The strengths and limitations of this study are acknowledged. The strength of this study is the use of a standardised, Malay-validated questionnaire specifically designed to assess malnutrition and QoL among older persons. The use of the Malay language facilitated better understanding and enabled respondents to complete the questionnaires easily. One of the limitations encountered in this study was that the data were collected online, which may have been difficult for older persons with limited access or familiarity with information technology. However, caregivers were informed to provide assistance. Additionally, this study was a cross-sectional study, which limits the ability to determine causal relationships between BMI and malnutrition towards QoL.

CONCLUSION

In conclusion, although most older adults were classified as having normal nutritional status by both MRST-H and MNA-SF (approximately two-thirds), nearly half of the older adults were either underweight or overweight based on the BMI classification. About one-third were identified as being at risk of malnutrition, whereas only 4.1% were malnourished. Older persons with malnutrition were associated with

lower QoL in both mental and physical component summaries. Those who were at high risk of malnutrition were also associated with lower QoL in the social functioning domain. There was no significant association between BMI and QoL. This study highlighted the need to address the aspects of malnutrition among people aged 60 years and above, as malnutrition has a significant association with QoL. Thus, the role of nutrition should be prioritised to achieve better QoL among older persons, especially during the COVID-19 pandemic. Early nutritional status assessment is crucial to enable corrective interventions to prevent malnutrition and enhance QoL among older persons. Additionally, healthcare professionals should integrate nutrition education into a comprehensive healthy lifestyle approach to promote improved QoL and support healthy ageing.

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Authors' contributions

Sakinah H, principal investigator, supervised Nur Hazierah AR in conceptualising and formulating the research plan, provided guidance on data analysis and interpretation, and reviewed the manuscript; Nur Kamilah MF, assisted with data interpretation, prepared the draft of the original manuscript, and reviewed the manuscript; Nur Hazierah AR, conducted data collection of the study, data analysis and interpretation, and reviewed the manuscript; Almira S, supervised Nur Hazierah AR in conceptualising and formulating the research plan, assisted with data interpretation and reviewed the manuscript. All authors participated in reviewing and approving the final manuscript.

Conflict of interest

The authors declare no conflict of interest.

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