INFORMATION BRIEF (RAPID REVIEW)

EQUINE ASSISTED THERAPY FOR CANCER

Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia
018/2022

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Please contact htamalaysia@moh.gov.my if further information is required.

Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia
Level 4, Block E1, Precinct 1
Government Office Complex
62590, Putrajaya
Tel: 603 8883 1229

Available online via the official Ministry of Health Malaysia website: http://www.moh.gov.my

eISSN:

SUGGESTED CITATION: Fatin NM and Izzuna MMG. Equine Assisted Therapy for Cancer. Information Brief. Ministry of Health Malaysia: Malaysian Health Technology Assessment Section (MaHTAS); 2022. 10 p. Report No.: 018/2022. eISSN: ……

DISCLOSURE: The author of this report has no competing interest in this subject and the preparation of this report is entirely funded by the Ministry of Health Malaysia.

TITLE: EQUINE ASSISTED THERAPY FOR CANCER

PURPOSE

To provide brief information on the effectiveness, safety and cost-effectiveness of equine assisted therapy for cancer based on request from the Deputy Director General's (Medical) Office, Ministry of Health Malaysia.

BACKGROUND

Cancer is the leading cause of death globally, accounting for nearly 10 million deaths in 2020.[1] According to Malaysia National Cancer Registry Report, a total of 115,238 new cancer cases were diagnosed in Malaysia for the period of 2012-2016. The annual cancer incidence in Malaysia is increasing over the 10 years; the incidence in females was noted to be higher than males.[2] Each year approximately 400,000 children develop cancer and the most common cancers vary between countries.[1] Meanwhile in Malaysia, the main cancers in the children below age of 14 were leukaemia, followed by brain, nervous system and lymphoma.[2]

As with all potentially chronic diseases, a cancer diagnosis and the subsequent treatment come not only with enervating physical consequences, but also with concomitant psychological distress. Several studies showed that the psychological distress from cancer could cause remarkable problems with adherence to treatment and increased the risk of morbidity and mortality.[3-5] Therefore, there was a continuous need for intervention strategies to address psychological distress and cancer-related side effects.

The establishment of the term "human-animal bond" or "animal-assisted interventions" in the late 1970s signified the recognition of the importance of the potential therapeutic role animals.[7] The term was defined as goal-oriented and structured interventions that intentionally incorporate animals in health, education and human service for the purpose of therapeutic gains and improved health and wellness.[8] Horses (equine) were claimed as appropriate animal-assisted intervention, as they have social characteristics similar to that of humans and demonstrate preference for peer and social interactions.[9] Horses are responsive to human behaviours and provide immediate, instinctual feedback to the people who interact with them.[10]

There are two basic modalities that use the horse therapeutically:[11]

a. Hippotherapy: In traditional hippotherapy, the movement of the horse helps improve neurological function and sensory processing. Specific riding skills are not taught.

b. Therapeutic riding: Therapeutic or remedial riding invites the participation of people with a wide range of physical, cognitive and/or emotional disabilities, using the equine-human relationship to foster ego strengthening, self-confidence and social competence.

(a) **(b)**

Figure 1: The patients learnt basic ground work with horses.[12,13]

Currently in Malaysia, there are several non-profit organisations and agencies which provide the equine-assisted therapy for the disabled. However, none of them have encountered cancer patients.[17-20]

EVIDENCE SUMMARY

A total of 43 titles were retrieved from the scientific databases such as Medline, EBM Reviews, EMBASE via OVID, PubMed and 587 from the general search engines [Google Scholar and US Food and Drug Administration (USFDA)]. Additional articles were identified from reviewing the references of retrieved articles. Last search was conducted on 30 September 2022. Three articles were found to be relevant and included in this review which comprised of one randomised controlled trial, one pilot study and one descriptive survey study.

EFFECTIVENESS/ EFFICACY

There were two studies reported on the efficacy of equine-assisted therapy for cancer.

Cerulli C et al. (2014) conducted a randomised controlled trial to evaluate the psychological effects of an equine-assisted therapy protocol in breast cancer survivors. Twenty women who had mastectomy (mean age 45.61±2.71 years) were recruited in Belcolle Hospital, Italy with following eligibility criteria; age 40 to 50 years, conclusion of all cancer-related treatments at least six months previously, mastectomy, no external physical activity for at least preceding 12 months and medical eligibility for non-competitive athletic activity. All patients underwent a series of baseline assessments over seven days, including functional assessment and psychological measurements (Functional Assessment of Chronic Illness Therapy-Fatigue; FACIT-F). The patients were randomly divided into two groups: the intervention group (n=10) and the control group (n=10).[14, level I]

The equine-assisted therapy was held at the Therapeutic Riding Centre of Italian Equestrian Federation “II Giradino di Filippo” in Italy. The therapeutic riding setting included the patients, the horse and a therapist specialised in equestrian rehabilitation. All the intervention group patients received two sessions of one-hour therapeutic riding treatments for 16 weeks. Each riding session consisted of three phases; (1) warmed up, horse care, groom, (2) ride, (3) unsaddle and groom activity. The control group was instructed not to begin any new formal physical exercise program. After the 16-weeks intervention period, all patients underwent the same series of assessments completed at baseline.[14, level I]

The study showed:[14, level I]

a. Cardiorespiratory fitness

The measured heart rate was used to estimate maximal oxygen uptake (VO_2max) with a correction factor of age. The follow up analysis showed a significant increase ($p<0.001$) in the intervention group **(see Table 1).**

b. Body composition

Body composition was assessed via a portable multi-frequency digital bioelectrical impedance device. The analysis was expressed as absolute and percentages of body mass values. Fat mass percentage and total body water percentage were taken into account for the analysis. In the intervention group, the result showed a significant decrease in percent body fat ($p=0.002$) and a significant increase ($p=0.027$) in the total body water percentage **(see Table 1).**

c. Maximal strength of principal muscle groups

Maximal strength was evaluated for each of five weight-lifting machines; leg press, leg extension, leg curl, shoulder press and vertical traction. **Table 2** reported that the maximal strength significantly improved in all lifting machine only for the intervention group.

d. Quality of life

The quality of life was assessed by using the FACIT-F questionnaire. The FACIT-F included the Functional Assessment of Cancer Therapy-General (FACT-G) which consisted of four primary domains; physical well-being, social/family well-being, emotional well-being and functional well-being. Higher scores were associated with greater quality of life. The analysis highlighted a significant improvement of all domains in the intervention group **(see Table 3)**.

Table 1: Patients' cardiorespiratory fitness and body composition measures before and after equine-assisted therapy protocol[14, level I]

Variable	*Before intervention*	*After intervention*	p-*Value*	η^2p	*Change (%)*
VO_2max (ml/kg per min)					
Intervention	24.39±4.84	31.29±4.95	<0.001	0.876	28.29
Control	31.49±10.59	32.26±10.10	>0.05*	–	2.45
FAT (%)					
Intervention	28.96±4.49	26.72±5.34	0.002	0.673	−7.73
Control	30.17±3.98	30.55±4.40	>0.05*	–	1.26
TBW (%)					
Intervention	52.05±4.51	55.64±7.56	0.027	0.436	6.90
Control	51.43±2.82	51.34±2.79	>0.05*	–	−0.17

*Cutoff for significance was >0.05.
VO_2max, maximal oxygen consumption; FAT (%), fat mass percentage; TBW (%), total body water percentage.

Cerulli C, Minganti C, De Santis C et al. Therapeutic Horseback Riding in Breast Cancer Survivors: a Pilot Study. J Altern Complement Med. 2014: 20(8); 623-629.

Table 2: Maximal strength of principal muscle groups before and after equine-assisted therapy protocol, evaluated by five weight-lifting machines[14, level I]

Variable	*Before intervention*	*After intervention*	p-*Value*	η^2p	*Change (%)*
Leg press (kg)					
Intervention	97.48 ± 22.79	114.88 ± 17.09	0.018	0.478	17.85
Control	85.63 ± 20.94	79.13 ± 17.78	>0.05*	–	−7.59
Leg extension (kg)					
Intervention	42.64 ± 10.70	51.83 ± 9.21	0.005	0.608	21.55
Control	44.38 ± 13.55	44.25 ± 10.83	>0.05*	–	−0.29
Leg curl (kg)					
Intervention	41.70 ± 9.61	52.56 ± 11.39	<0.001	0.894	26.04
Control	39.50 ± 6.78	36.76 ± 9.12	>0.05*	–	−6.94
Shoulder press (kg)					
Intervention	10.74 ± 4.82	16.08 ± 5.43	0.003	0.651	49.72
Control	16.84 ± 5.66	17.20 ± 8.05	>0.05*	–	2.14
Vertical traction (kg)					
Intervention	43.90 ± 8.64	52.36 ± 7.57	0.002	0.676	19.27
Control	38.63 ± 10.16	33.88 ± 11.41	>0.05*	–	−12.30

*Cutoff for significance was >0.05.

Cerulli C, Minganti C, De Santis C et al. Therapeutic Horseback Riding in Breast Cancer Survivors: a Pilot Study. J Altern Complement Med. 2014: 20(8); 623-629.

Table 3: Functional assessment of chronic illness therapy-fatigue outcomes before and after equine-assisted therapy protocol[14, level I]

Variable	*Before intervention*	*After intervention*	p-*Value*	η^2p	*Change (%)*
FACIT-F trial outcome					
Intervention	81.28 ± 9.71	88.83 ± 5.09	0.010	0.541	9.29
Control	72.08 ± 6.40	68 ± 4.92	>0.05*	–	−5.66
FACT-G total score					
Intervention	74.24 ± 8.11	85.23 ± 4.20	0.022	0.678	14.80
Control	70.67 ± 65.89	65.89 ± 14.66	>0.05*	–	−6.76
FACIT-F total score					
Intervention	114.94 ± 14.07	128.13 ± 5.90	0.004	0.616	11.48
Control	103.67 ± 7.60	98.89 ± 20.79	>0.05*	–	−4.60

Higher scores are associated with greater quality of life.
*Cutoff for significance was >0.05.
FACIT-F, Functional Assessment of Chronic Illness Therapy-Fatigue; FACT-G, Functional Assessment of Cancer Therapy-General.

Cerulli C, Minganti C, De Santis C et al. Therapeutic Horseback Riding in Breast Cancer Survivors: a Pilot Study. J Altern Complement Med. 2014: 20(8); 623-629.

A pilot study conducted by Murphy L et al. (2019) determined the influence of an equine-facilitated survivorship program on emotional distress and quality of life. Healing with Horses program was developed and implemented by equine specialist and a licensed oncology social worker, located in the south-eastern United States. Four adults (mean age; 62 SD7.07) diagnosed with cancer who completed initial rounds of traditional therapies were recruited from September to November 2017. All participants described negative physical and emotional responses from cancer diagnosis and treatment, including pain, diminished memory, fatigue, loss of motivation and autonomy, and isolation. The Functional Assessment of Cancer Therapy-General (FACT-G) analysis identified positive trends in three of the four categories of well-being (physical well-being; p=0.34, emotional well-being; p=0.09, functional well-being; p=0.31), although these changes were not statistically significant. Nevertheless, the analysis of the total quality of life mean score demonstrated a statistically significant improvement in quality of life (p=0.01) **(see Table 4)**.[15]

Table 4: Functional assessment of cancer therapy – general results[15]

Variable	Pretest mean (SD)	Post-test mean (SD)	*t*-Value	*df*	*P*-value
Physical well-being	22.30 (5.41)	23.75 (2.87)	− 1.13	3	0.34
Social/family well-being	22.25 (3.59)	21.75 (4.27)	7.78	3	0.50
Emotional well-being	19.50 (1.91)	20.50 (1.73)	− 2.45	3	0.09
Functional well-being	21.18 (3.92)	22.25 (3.95)	− 1.21	3	0.31
Total score	85.23 (8.89)	88.25 (9.22)	− 5.93	3	0.01

SD, standard deviation.

Murphy L, Goehmann B & Panczykowski H. Healing with Horses: Pilot Study of Equine-Facilitated Cancer Therapy. Medicine (New York NY). 2019: 25(4); 201-207.

SAFETY

There was no retrievable evidence reported on the safety of equine-assisted therapy for cancer. However, one study reported on the general safety of equine-assisted therapy.

A descriptive survey study conducted by Peters BC et al. (2020) described the safety and practice patterns of contemporary use of hippotherapy. A total of 92 respondents were included in the analysis (occupational therapists, physical therapists and speech-language clinicians who used hippotherapy in the United States within the past 12 months). The survey included four sections with closed and open-ended questions related to clinical background, safety procedures, occurrences and injuries. The safety procedures section gathered information about trainings, emergency protocols, safety equipment and emergency dismounts.[16]

The study stated that, there were unexpected dismounts (n=86), spooked horse (n=85), inclement weather (n=80), client injury (n=78), fire (n=72), loose horse (n=71) and others (sidewalk tripped=3, active shooter=3, staff injury=2).[16]

Within 12 months, the reported injuries involving a sprain and back inflammation. Those injuries were caused by horse spooking, an unanticipated movement by the client and unanticipated movement of the horse during mounting. One injury involved a client falling from the horse to the ground. However, there was no injury resulted in a hospital admission or liability claim.[16]

COST-EFFECTIVENESS

There was no evidence retrieved on cost-effectiveness of equine-assisted therapy. Nevertheless, a wide range of rates were charged for subscribing this therapy **(see Table 5).**

Table 5: Rates of equine-assisted therapy regardless of the disease.

No.	Country	Organisation	Rate
1.	United Kingdom	Equine Therapy Center[21]	• Young person: [redacted] hour • Adult: [redacted] hour
2.	United States	National Center for Equine Assisted Therapy[22]	• [redacted] to [redacted] session
3.	United States	Equine Therapy Group[23]	• Children/ youths: [redacted] session
4.	Malaysia	Kelab Equestrian Cape Cavallho[17]	• [redacted] hour
5.	Malaysia	Green Apple Hippotherapy[20]	• Silver package: [redacted] month (weekdays) [redacted] month (weekends) • Gold package: [redacted] month (weekdays) • Platinum package: [redacted] month (unlimited days)
6.	Malaysia	Riding for the Disabled Association Malaysia[19]	• [redacted]
7.	Malaysia	Yayasan Orang Kurang Upaya Kelantan[18]	• [redacted]

CONCLUSION

There was limited evidence on equine-assisted therapy for cancer. Nevertheless, the evidence showed that the equine-assisted therapy may improve the cardiorespiratory fitness, water and fat composition in the body, muscle strength and quality of life.

As per safety, generally the equine-assisted therapy was reported to have various incidents involving the horse and the participants. However, there was no injury resulted in a hospital admission or liability claim.

There was a wide range of rates were charged for subscribing to this therapy depending on the package offered or session availability. Fortunately, two organisations in Malaysia offered the service free of charge for needs regardless of their financial and social status.

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Prepared by

Fatin Nabila Mokhtar
Assistant Director
Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

Reviewed by

Dr. Izzuna Mudla Mohamed Ghazali
Public Health Physician & Deputy Director
Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

12 October 2022