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Research Article

Effect of Two Different Catheter Dressings on Pain, Comfort, and Satisfaction in Chemotherapy Patients: A Randomized Controlled Study

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Abstract

AIM: The incidence of cancer is increasing on a daily basis. Chemotherapy is one of the methods used in cancer treatment. Chemotherapy is administrated through a peripheral venous catheter. During intravenous chemotherapy, the patient may experience pain and his comfort may deteriorate. This study aimed to determine the effect of two different catheter dressings on the patient's comfort, satisfaction, pain level, and nurse satisfaction.
METHODS: A randomized controlled study was designed. Data of the study It was collected between March and June 2022. Participants were patients who were continuing chemotherapy treatment at a university hospital. The sample consisted of 70 (35 + 35) cancer patients. Sociodemographic information form and visual analog scale were used to collect data.
RESULTS: There is no difference in the pain level of the masking tape and standard plaster groups. The patient's comfort, satisfaction, and the nurse's use satisfaction were higher in the group where masking tape was used. There is a very strong positive correlation between patient comfort and patient satisfaction in the masking tape group. The effect size of the applied intervention is very weak. ($p > .05$).
CONCLUSION: Masking tape can be applied safely as a peripheral venous catheter dressing. ($p < .05$).
Keywords: Catheter dressing, chemotherapy, comfort, nursing, pain, satisfaction

Introduction

Cancer is a chronic and potentially fatal disease, and the incidence of which is increasing day by day. Chemotherapy is one of the most commonly used methods of treatment (NCI, 2022). Venous chemotherapy is administered via peripheral venous catheters (PVC), central catheters, or port catheters (Fang, Yang, Song, Jiang, & Liu, 2017). Satisfaction and quality of life of patients who receive chemotherapy via central catheter/port catheter are higher than PVCs (Robinson et al., 2018). In the literature, it is recommended to primarily use central vascular access in intravenous chemotherapy applications (Clemons et al., 2020). However, PVCs may be preferred instead of permanent catheters for different medical reasons or because of the patient's fears related to port catheter application (Kreis et al., 2007). In the preference of the PVCs, the patients' reasons such as body image, fear, and social adaptation difficulties are seen as factors (Uslu et al., 2020).

In patients receiving chemotherapy with PVCs, complications such as infiltration, phlebitis, extravasation, hematoma, and hemorrhage may develop (Özkaraman & Usta Yeşilbakan, 2014). Complications cause the patient to experience pain, decreased comfort and satisfaction, and thus adversely affect the treatment process (Karius & Colvin, 2021). The choice of the catheter dressing is important in the prevention of PVC-related complications (Artuk Uçar & Arikan, 2018). Adhesive tapes used as a catheter dressing may cause pain when separated from the skin during catheter care or removal. The dressings should adhere thoroughly to the skin, but should not damage the skin when they are removed (Özsayın, 2021). Skin care and skin protection are important requirements for patients undergoing chemotherapy treatment because chemotherapy increases skin sensitivity of the skin (Menekli et al., 2022).

Use of PVCs adversely affects pain and comfort in the patient (Çelik & Avşar, 2021). Comfort affects patient satisfaction. In the literature, there is a study that examined the effects of central catheters on the patient's pain, comfort, and satisfaction (Gezginci et al., 2020). However, no study has investigated the effect of dressing used with PVC on pain, comfort, and satisfaction of the patient, and the satisfaction of the nurse regarding the use of catheter dressing. Nurses are responsible for PVC application, patient education (El Fadi, 2020), protection,

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monitoring, and accurate fixation of vascular access (Pluschnig et al., 2015). Accurate fixation of PVCs will be possible with the use of proper dressings (de Lima Jacinto et al., 2011). Generally, plaster + sterile gauze or sterile transparent dressings are used for the fixation of PVCs. Although it is recommended to use transparent dressings, a combination of plaster + sterile gauze may be preferred because the transparent dressings are not cost-effective (Unal & Unal, 2019).

In the literature, the effect of different central catheters on the patient's pain, comfort, and satisfaction (Gezginci et al., 2020) and the effect of the length of the catheter used on the patient's pain and comfort were evaluated (Karabey & Karagozoglu, 2022). In another study, the effect of the catheter on pain, comfort, and satisfaction was examined, and recommendations for catheter care were presented (Mulemba et al., 2021). However, there is no study that investigated the effect of catheter dressings on the patient's pain, comfort, and satisfaction, and on the nurse's satisfaction in PVCs. The literature suggests that central venous catheters should be preferred primarily in chemotherapy application (Clemons et al., 2020). However, patients prefer PVCs instead of port catheters due to reasons such as body image, fear, and social adaptation difficulties (Uslu et al., 2020). The aim of this study was to determine the effect of two different catheter dressings used in chemotherapy patients on the patient's comfort, pain level, satisfaction, and the nurse's satisfaction.

Hypotheses

H1: There is a difference between the comfort scores of the experimental and control groups.
H2: There is a difference between the pain scores of the experimental and control groups.
H3: There is a difference between the satisfaction scores of the experimental and control groups.
H4: There is a difference between the satisfaction scores of the nurses in terms of catheter dressings use in the experimental and control groups.
H5: There is a relationship between the pain, comfort and satisfaction states of the experimental and control groups.

Methods

Study Design

It is an open label randomized controlled posttest study. It was planned according to the CONSORT criteria (Schulz, 2010) (Figure 1).

Sample

Population of the research: The population of the research consisted of patients receiving treatment in the Chemotherapy Unit of Necmettin Erbakan University Faculty of Medicine Hospital. The sample size was determined by performing power analysis (G*power package software program). The results of another study were used in the calculation (Yılmaz & Güneş, 2018). There should be at least 27 people in each group with an effect size of 0.92, a power of 0.95, and a margin of error of 0.05. Potential losses were taken into account, and the sample was increased by 25% accordingly. The study was completed with 70 patients, and the post hoc power of the study was 0.98.

Randomization and blinding: Randomization was done using a computer program (Random.org). The researcher, nurses, and patients were not blinded, only the statistician was blinded. The groups were sent to the statistician as "A" and "B" groups. Which group is A/B was explained after completion of the article. Individuals between the ages of 18–65 years, who have no communication barriers, who received chemotherapy treatment via PVCs, and who volunteered to participate were included in the study. Participants received chemotherapy treatment in a day treatment unit. Individuals with neurological and mental problems, vision/hearing/sensory losses, and terminally ill were excluded from the study.

Data Collection Tools

The data were collected face to face by the researchers. Written consent was obtained from all patients. The data were collected using a sociodemographic information form and visual analog scale. In the intervention, masking tape was used in the experimental group, and a standard plaster containing acrylate was used in the control group as a catheter dressing. Coronavirus disease 2019 precautions were followed while collecting data.

Sociodemographic Data Form

The form includes 15 questions about sociodemographic characteristics (age, education, and income, among others) and diseases (duration of diagnosis, duration of treatment, and diagnosis, among others) of the patients.

Visual Analog Scale

The scale consists of a horizontal or vertical line. The scale is scaled to 10 cm/100 mm. A score of 0 indicates that the pain level was low and a score of 10 indicates that the degree of pain experienced by the patient is considerable (Collins et al., 1997). In this study, the horizontal form of the same scale was used to evaluate pain, comfort, and satisfaction. In the evaluation of pain, the patients were asked to evaluate the pain when the plaster was separated from the skin during the removal of the catheter after the treatment. A score of 0 on the scale indicates no pain during the procedure, and a score of 10 indicates unbearable/very severe pain. In the comfort evaluation, a score of 0 on the scale indicates that the fixation of the catheter is not comfortable at all, and a score of 10 indicates that it is perfectly comfortable. In the evaluation of satisfaction, for both patients and nurses, a score of 0 on the scale indicates that they are not at all satisfied with the catheter application and fixation, and a score of 10 indicates that they are perfectly satisfied. The patients and nurses were asked to score the relevant parameters between 0 and 10.

Data Collection

The data were collected in the day treatment chemotherapy unit between March and June 2022. A is the experimental group and B is the control group. In the experimental group, the patients were informed about the procedure, their consent was obtained, and preliminary data were collected with the

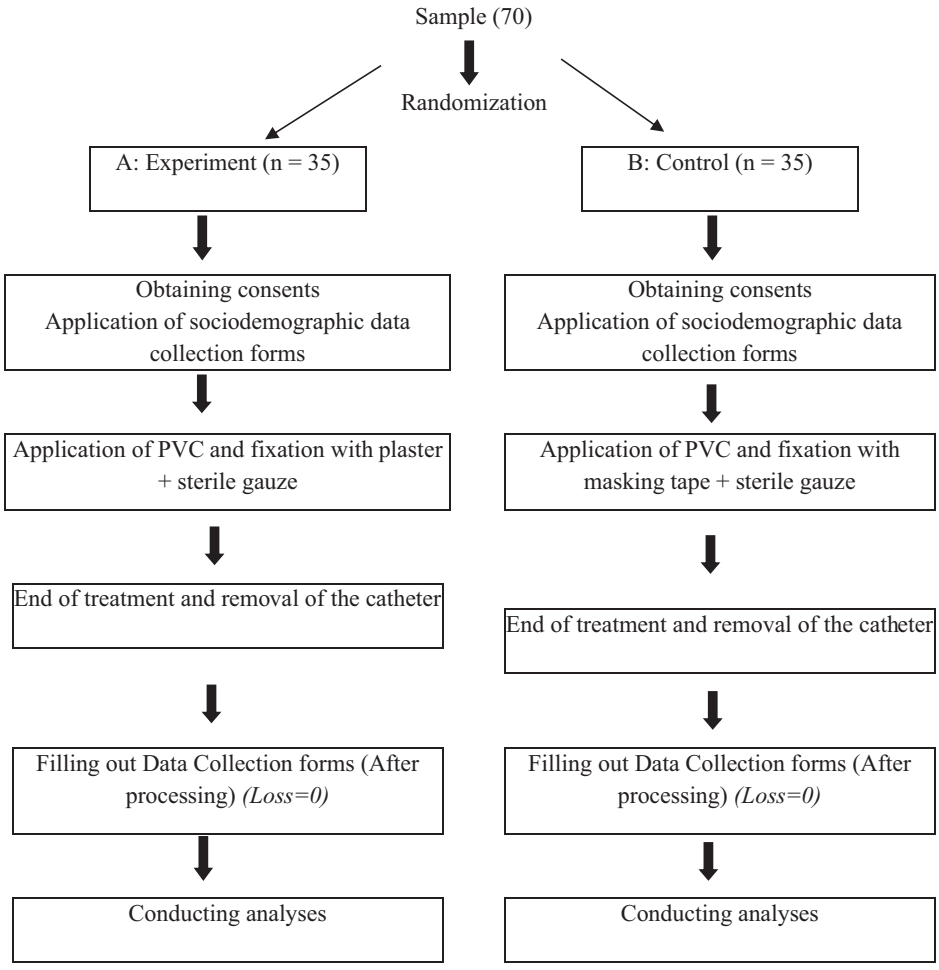

Figure 1.
CONSORT Research Flowchart.

sociodemographic data collection form before the procedure. The PVCs were applied to the patient. by the chemotherapy nurse according to the institution's application guidelines and fixation was performed. During the chemotherapy treatment process, the patient's follow-up was continued by the nurses as in routine. At the end of the treatment, the PVCs were removed and the application area was covered with masking tape. Then, the researcher asked the patient to evaluate pain (pain during application and removal of plaster tape), comfort, and satisfaction. At the same time, the nurse was also asked to evaluate the masking tape regarding satisfaction. The control group was also subjected to the same procedures as the experimental group. However, in this group, fixation and closure were performed with a standard plaster.

The clinical routine was not interfered with in the application of the catheters, the treatment and follow-up phase, and the end of the procedure. In the clinical routine, each nurse opens the PVC of her own patients, applies chemotherapy, performs follow-up, care, and end of treatment process. In this context, each nurse performed the intervention again on her own patients. The researcher was only involved in obtaining consent and collecting data. The number of patients treated by each nurse is not the same. In accordance with the randomization table, whichever nurse's patient was included in which group was communicated to the nurse, and the intervention was applied to the patient with the appropriate catheter cover. When choosing the PVC site, veins in the non-traumatized region were preferred.

Masking Tape: It is a tape that adheres well to the surface and can be removed very easily from the surface. The tape is also easy to intervene with gloves, does not stick to the glove, and can be torn by hand. It has been explained by the company that the tape used in the study can be used for medical purposes. It is not a sterile product (Megabant, 2021). For this reason, the masking tape was applied after the PVCs entry site was covered with sterile gauze.

Plaster: An acrylate-containing tape that was produced for medical use was used. This tape is a hypoallergenic product that adheres very well and is recommended to be separated from the skin using solvents (Özsayın, 2021). The product is difficult to use with gloves and it is not possible to tear it by hand. It was applied after on the PVCs entry site was covered with sterile gauze.

Statistical Analysis

Statistical analyses were done in The Statistical Package for Social Sciences version 22.0 software (IBM Corp.; Armonk, NY, USA). The Kolmogorov–Smirnov test was used for normality analysis. Numbers and percentages were used in the distribution of sociodemographic and disease/treatment characteristics. The Mann–Whitney *U*-test and the Kruskal–Wallis test were used to compare sociodemographic data and assessment scores. In the evaluation of the effect of the material used, the Cohen's *d* effect size and the relationship between the measurements were evaluated with the Spearman's correlation analysis. As a result of the calculations, ≤0.20 was considered a weak effect size; $0.20 < d < 0.80$ was considered as a medium effect size, and $d \geq 0.80$ was considered a large effect size. In the evaluation of correlation, $r \leq 0.25$ was considered very weak, $0.26 \leq r \leq 0.49$ weak; $0.50 \leq r \leq 0.69$ medium, $0.70 \leq r \leq 0.89$ strong, and $0.90 \leq r < 1$ very strong (Kılıç, 2014).

Ethical Considerations

Ethical dimension of study: Research permission was obtained from Necmettin Erbakan University Health Sciences Scientific Research Ethics Committee (Approval No: 2022/18-118, Date: January 5, 2022) and application permission was obtained from Necmettin Erbakan University Medical Faculty Hospital (No: 36261, Date: January 18, 2022). Registered on Clinical Trails (NCT05264844).

Results

It was determined that only the BMI and age variables were normally distributed, while other variables were not normally distributed ($p < .05$). In the results, group A refers to the experimental group and group B refers to the control group. The groups are similar (Table 1).

There was no difference in the pain levels between the groups. The patients' comfort and satisfaction scores of the masking tape + sterile gauze group and the satisfaction score of the nurse who performed the application to the patients in this group were higher compared to the group plaster + sterile gauze) and the difference was significant ($p < .05$). The effect size of the intervention applied was very weak ($d \leq .20$) (Table 2, Figure 2).

According to the results of Spearman's correlation analysis, there is a very strong and positive correlation between comfort and patient satisfaction in the masking tape + sterile gauze group. In the plaster + sterile gauze group, a weak negative correlation ($0.26 \leq r \leq 0.49$) was found between pain and comfort and between pain and patient satisfaction (Table 3).

Discussion

In this study, the effects of two different catheter dressings of PVCs on patients' pain, comfort, satisfaction, and nurses' satisfaction were examined. There are many options in the selection of the catheter dressing (standard plasters, hypoallergenic plasters, transparent dressings, etc.) (Corley et al., 2019). In the literature, it is stated that central venous catheters should be preferred primarily in chemotherapy application (Clemons et al., 2020). However, in a qualitative study, patients stated that they were not given a preference for the use of the central venous catheter. Patients prefer PVCs instead of central venous catheters for reasons such as body image, fear, and social adaptation difficulties (Uslu et al., 2020). In this study, masking tape + sterile gauze was used in the experimental group, and plaster + sterile gauze was used in the control group. There are no statistically significant differences in the characteristics of the individuals in the experimental and control groups, in terms of sociodemographic and disease/treatment characteristics. The groups are homogeneous.

In the present study, the masking tape + sterile gauze group did not experience any pain during the removal of the PVC dressing, and there was no difference between the masking tape + sterile gauze and the plaster + sterile gauze in terms of pain. Studies in the literature aim to reduce pain during the application of PVCs (NehadSabry & Nagwa Ibrahim, 2018; Yılmaz & Güneş, 2018). It is stated that PVC dressings irritate the skin when removed. Chemotherapy increases skin sensitivity of the skin and the possibility of irritation (Menekli et al., 2022). Standard plasters adhere well to the skin and may damage the skin when removed. However, the masking tape adheres to the skin and can be separated without damaging the skin.

The most comfortable vascular access for patients is central catheters (Unal & Unal, 2019). But PVCs are also used (Uslu et al., 2020). The presence of PVCs may negatively affect the comfort of the patient (Ansel et al., 2017). Peripheral venous catheters application is an interventional procedure and the catheter entry site should be closed properly (Kurt, 2018). According to the national guideline, it is recommended to cover PVCs with sterile transparent dressings (Unal & Unal, 2019). However, when there is a problem of accessing the transparent dressings, it can be closed with sterile gauze and plaster (Şanlı & Sarıkaya, 2016). The correct selection and correct use of the catheter dressings will reduce the problems and complications (Rızalar et al., 2019). The pain negatively affects the comfort of the patient (Mandal & Raghu, 2019). Catheter-related pain disturbs the comfort of the patient with PVCs (Özkaraman & Usta Yeşilbakan, 2014). In this study, the patients in the masking tape + sterile gauze group had higher comfort and satisfaction scores than the plaster + sterile gauze group. Good adhesion of the masking tape to the skin, but also easy separation may be related to the high level of patient comfort.

The correct application of PVC and the absence of complications affects patient satisfaction by increasing comfort (Lim et al., 2018). Providing the necessary conditions, appropriate environment, and materials for the application of the PVCs allows the nurse to perform the applications more accurately (Çelik & Avşar, 2021). In this study, the satisfaction scores of the nurses for the practice masking tape + sterile gauze were significantly higher and more significant than the plaster + sterile gauze group. It can be said that as comfort increases in patients who are applied masking tape, patient satisfaction also increases. Peripheral venous catheters application is an important intervention in patients receiving chemotherapy. For this reason, the skills of nurses and the selection of necessary materials for the

Table 1.
Distribution of Sociodemographic, Disease, and Treatment Characteristics of the Groups (N = 70)

Variables	Group A (Experimental) (Masking Tape + Sterile Gauze) (n = 35)		Group B (Control) (Plaster + Sterile Gauze) (n = 35)		Test and *p*
	n	%	n	%	
Sex					
Female	24	68.6	25	71.4	$\chi^2 = 0.068$ $p = .794$
Male	11	31.4	10	28.6	
Education					
Illiterate	6	17.1	5	14.3	$\chi^2 = 5.713$ $p = .126$
Primary education	22	62.9	23	65.7	
Secondary education	7	20.00	3	8.6	
University	0	0.00	4	11.4	
Marital Status					
Married	24	68.6	30	85.7	$\chi^2 = 2.917$ $p = .088$
Single	11	31.4	5	14.3	
Working Status					
Retired	19	54.3	18	51.4	$\chi^2 = 0.731$ $p = .694$
Paid employee	2	5.7	4	11.4	
Unemployed	14	40.0	13	37.1	
Income Status					
Good	0	0.00	5	14.3	*
Middle	32	91.4	27	77.1	
Bad	3	8.6	3	8.6	
Diagnosis					
Reproductive system cancers	20	57.1	23	65.7	*
Respiratory system cancers	8	22.9	3	8.6	
Digestive system cancers	3	8.6	5	14.3	
Other cancers	4	11.4	4	11.4	
Metastasis Status					
Yes	18	51.4	21	60.0	$\chi^2 = 0.521$ $p = .470$
No	17	48.6	14	40.0	
Size of the Catheter					
Pink (20G)	0	0.00	1	2.9	*
Blue (22G)	10	28.6	14	40.0	
Yellow (24G)	25	71.4	20	57.1	
Chemotherapy Application Site					
Metacarpal vein	25	71.4	23	65.7	$\chi^2 = 0.265$ $p = .607$
Cephalic vein	10	28.6	12	34.3	
Allergy Development Status					
Yes	0	0	0	0	*
No	35	100	35	100	
	Mean ± SD	[minimum–maximum]	Mean ± SD	Mean [minimum–maximum]	Test and *p*
Age	58.74 ± 7.45	[46–82]	57.11 ± 13.86	[31–78]	$t = 0.612$ $p = .542$
Body mass index	28.46 ± 6.23	[19–53]	28.17 ± 4.53	[18–40]	$t = 0.219$ $p = .827$
Duration of chemotherapy (months)	4.31 ± 3.39	[1–13]	7.51 ± 10.56	[1–45]	$t = -1.707$ $p = .092$
Chemotherapy infusion time (hours)	1.31 ± 0.47	[1–2]	1.34 ± 0.48	[1–2]	$t = -0.251$ $p = .803$

*Analysis could not be performed due to the numbers in the cells.

Table 2.
Distribution of Evaluation Scores of Patients and Nurses by Groups

	Group A Masking Tape + Sterile Gauze		Group B Plaster + Sterile Gauze			
Scores	**Mean Rank**	**Sum of Ranks**	**Mean Rank**	**Sum of Ranks**	**Test and *p***	**Cohen's *d***
Pain level	34.50	1207.50	36.50	1277.50	MWU: 577.50 *p* = .307	0
Comfort level	40.99	1434.50	30.01	1050.50	MWU = 420.50 *p* = **.020**	0.0080
Patient satisfaction level	41.19	1441.50	29.81	1043.50	MWU = 413.50 *p* = **.016**	0.0090
Nurse satisfaction level	41.29	1445.00	29.71	1040.00	MWU = 410.00 *p* = **.001**	0.0097

Values in bold indicate statistical significance.

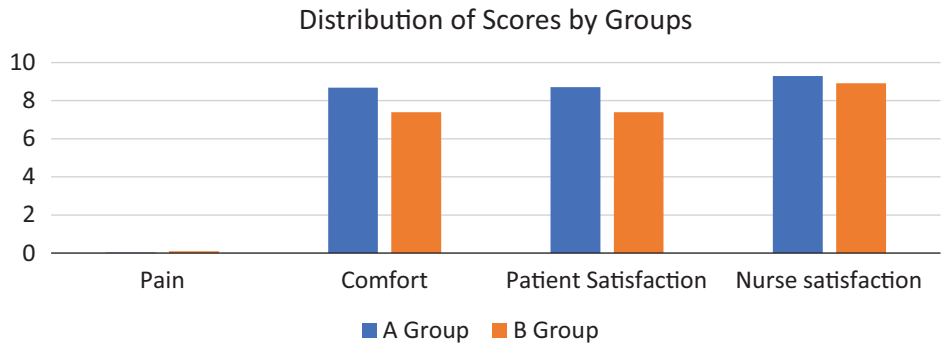

Figure 2.
Distribution of scores by groups.

procedure are very important. The fact that the masking tape does not stick to the glove, can be removed without the need for scissors, and the satisfaction of the patients is thought to increase the satisfaction of the nurse.

There is no difference between the masking tape + sterile gauze group and plaster + sterile gauze group in pain level. The comfort, patient satisfaction, and nurse's usage satisfaction are higher compared to the patient group in which plaster + sterile gauze. Masking tape + sterile gauze can be used for PVC dressing to increase patient comfort and satisfaction. It is recommended that studies about PVC dressings be supported by randomized controlled studies in different patient groups.

Study Limitations

The data were collected from a single center, and data collection was carried out during the coronavirus disease 2019 process. The fact that each nurse did not apply to the same number of patients and only the statistician was blinded are the limitations of the study. Therefore, the results cannot be generalized.

Conclusion and Recommendations

Masking tape + sterile gauze can be used for PVC dressing to increase patient comfort and satisfaction. It is recommended that studies on PVC dressings be supported by randomized controlled studies in different patient groups.

Table 3.
Distribution of Relationships Between Patients' Scores

	Group A Masking Tape + Sterile Gauze				Group B Plaster + Sterile Gauze			
	Comfort		**Patient Satisfaction**		**Comfort**		**Patient Satisfaction**	
Variables	***r***	***p***	***r***	***p***	***r***	***p***	***r***	***p***
Pain	0.194	.263	0.195	.263	−0.392*	**.020**	−0.392*	**.020**
Comfort	1.000**	–	0.994**	**.000**	1.000**	–	1.000**	–

Values in bold indicate statistical significance.
*Correlation is significant at the .05 level (two-tailed).
**Correlation is significant at the .01 level (two-tailed).

Ethics Committee Approval: Ethics committee approval for this study was received from Necmettin Erbakan University Health Sciences Scientific Research Ethics Committee (Approval No: 2022718-118, Date: January 5, 2022).

Informed Consent: Written informed consent was obtained from the participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – R.B., H.T.P.; Preparation – R.B.; Permissions – R.B., E.T.Y.; Data Collection – H.T.P., E.T.Y.; Analyses – Professional statistics specialist; Writing – E.T.Y.; Critics – R.B., H.T.P.

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Declaration of Interests: The authors declare that they have no competing interests.

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