Research Article

Effect of using vinegar compresses combined with antipyretic drug and only antipyretic drug in the management of fever: A comparative study

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Abstract

Background: Fever is among the most common reasons for pediatric emergency visits, and caregivers frequently combine pharmacological and physical strategies to reduce body temperature. Antipyret-ics such as paracetamol are widely used, while vinegar compresses remain a common complementary practice; however, their short-term added benefit in clinical settings is not well established. **Objec-tive:** To compare short-term temperature reduction after (i) cider apple vinegar compresses combined with intravenous (IV) paracetamol and (ii) IV paracetamol alone among febrile children. **Methods:** A quasi-experimental study was conducted in the emergency department of Karbala Teaching Hospital for Children (May–August 2025). One hundred and twenty children (2–7 years) with axillary temperature >37.5°C were enrolled and allocated in a 1:1 ratio to a vinegar compresses + IV paracetamol group or an IV paracetamol-only group. Axillary temperature was recorded at baseline and at 15-minute intervals for 60 minutes after the intervention. Descriptive statistics were computed; within-group temperature changes across time were evaluated using the Friedman test, and between-group comparisons at each time point were assessed using the non-parametric Mann–Whitney U test (SPSS v26). **Results:** Both groups showed decreasing mean temperature over time, with a larger and more rapid decline observed descriptively in the vinegar compresses + paracetamol group. Within-group analysis showed a statisti-cally significant reduction across time points in the combined-intervention group, with a large effect size, whereas changes in the paracetamol-only group were smaller over the same 60-minute window. **Con-clusion:** IV paracetamol remains an effective first-line intervention for febrile children in the ED. When used as an adjunct to antipyretic therapy, vinegar compresses may accelerate short-term temperature reduction in the first hour after treatment. Given the quasi-experimental design and pragmatic imple-mentation, confirmatory randomized trials with standardized compress preparation, safety monitoring, and longer follow-up are recommended before broad practice changes. **Recommendations:** Nurses and caregivers should be educated that complementary physical measures, if used, should be applied as adjuncts (not substitutes) to evidence-based antipyretic therapy, with attention to comfort and skin integrity. Future studies should incorporate randomization, detailed intervention standardization, and clinically meaningful outcomes beyond short-term temperature change.

Keywords: vinegar compresses, antipyretic drug, fever, a comparative study

1. Introduction

Fever defined as the condition in which the body's temperature rises above normal due to fluctuations in the temperature regulator in the hypothalamus. The condition is the natural body's response to various stimuli, such as infections or other stresses [1, 2]. Although there are differences in the literature on the range of axillary temperatures that constitute fever, typically it ranges from 37°C to 38°C. However, in clinical practice, many health care professionals consider a fever when the child's temperature reaches 37.8°C or higher, and sub febrile when they have temperatures between 37°C and 37.7°C [3, 4]. The word fever which meaning "heat," comes from Latin. Pyrexia is a Greek word that means fire or fever. Other interchangeable source for the word fever or pyrexia comes from the body temperature elevated due to the response of thermoregulatory pyrogens in the hypothalamus [5].The body temperature in the healthy individual may be affected by many environmental and biological factors including age, sex, metabolic changes, sleep/wake patterns, hormone disturbance, and physical activity levels [6]. Even though, this variability occurs in those

individuals, the body temperature is highly maintained within the thermal set point through the process of thermoregulation [7]. Approximately 65% of pediatric ambulatory visits are thought to be related to childhood fever. About 20% to 40% of parents report that their children have a fever each year, making feverish illness extremely frequent in young children. So, the childhood fever is the second most common reason for a child being admitted to the hospital [8, 9]. Numerous strategies have been developed to lower children's body temperatures. This can be accomplished through pharmacological or physical methods [10]. Physical method includes warm baths, sponging, compresses, ice packs, refrigerated blankets, fluid intake, removal of clothes, and room ventilation which is frequently used to reduce the body temperature by parents and health care professionals [11]. Pharmacological based methods involving the administration of antipyretic medications like Acetaminophen (Paracetamol) and ibuprofen that considered as the most widely prescribed and available over the counter antipyretic medications for management of fever in children [12, 13]. Compresses of cider apple vinegar improve the blood circulation system in the capillaries, which nourishes the skin and provides oxygen that will help to reduce the body temperature. Vinegar is considered also as a tonic restorative to the skin, which maintain the skin elasticity, keeping the skin's moisture and skin cell regeneration to ensure optimal evaporation [14, 15]. Antipyretic medications produces its effect by suppressing the prostaglandin synthesis. Thus, promotes the vasodilation of the peripheral signals with increased heat loss by resetting the thermoregulatory center of the hypothalamus to normal [16]. Fever management in pediatric populations have unique challenges. Parents and caregivers may face difficulties in distinguishing between viral and bacterial infections, leading to inappropriate use of antibiotics and improper use of over the counter medications potentially causing negative side effects [17]. According to this background the current study was aimed to investigate the effectiveness of using vinegar compresses combined with antipyretic drugs versus antipyretic drug alone in the management of fever among children.

Research Question

Is the vinegar compresses along with antipyretic drug more effective than only antipyretic drug in the management of fever?

2 Methods

2.1 Study Design and Setting

A quasi-experimental study was conducted in the emergency department (ED) of Karbala Teaching Hospital for Children from 25th May 2025 to 30th August 2025.

2.2 Study Sample and Sampling

A non-probability purposive sample of 120 children aged 2–7 years who presented with fever to the ED was enrolled and allocated in a 1:1 ratio (60 participants per group) into the following study arms: Group A: Vinegar compresses + antipyretic drug (intravenous (IV) paracetamol). Group B: Antipyretic drug only (IV paracetamol).

Participants were selected according to the following criteria:

Inclusion criteria

- Children with axillary body temperature above 37.5°C.
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2.3 Study Instruments

The following tools were used to collect the data:

2.3.1. Structured interviewing questionnaire. It was designed in the English language by the researchers based on the questionnaire was constructed in previous related study [19, 20]. It composed of two parts: The first part was concerned with the child's demographic characteristics such as; age and sex. The second part was concerned with the child's clinical data such as; type and duration of fever, associated symptoms

with fever, and previous hospitalization.

- Children aged between 2–7 years old.

Exclusion criteria

- Children with abnormal skin conditions such as burns, rashes, ulcers, lesions, open wounds, or any condition that would prohibit the use of vinegar compresses.
- Children with a history of anaphylactic reaction to vinegar or related products.

For this study, the minimum sample size required for each group was 60 participants. The sample size was estimated using a 95% confidence level and a 5% margin of error following a standard sample size calculation procedure [18]. Because this was a pragmatic ED-based study, the target sample also reflected feasibility within the study period. Study flow diagram is shown in Figure 1 explaining the recruitment and allocation to study groups.

Figure 1: Flowchart of sample distribution

2.4 Data Collection and Application of the Study Protocol

Data were collected in the ED after the child was clinically assessed and confirmed to have fever by the attending team. After caregiver consent, baseline (pre-test) information was obtained using the structured questionnaire (demographic and clinical data) and the vital signs sheet. Axillary temperature was measured using a mercury thermometer prior to any study intervention and recorded as the pre-test value for both groups. Each participant required approximately 5–10 minutes to complete baseline assessment. After baseline measurement, participants received their allocated intervention. In Group A, children received IV paracetamol and cider apple vinegar compresses applied to standard body sites (under the axilla, behind the knee, and between the thighs) for [15] minutes. In Group B, children received IV paracetamol alone according to routine ED practice. Post-intervention axillary temperature was measured and recorded at 15, 30, 45, and 60 minutes using the same thermometer and measurement approach in both groups. This standardized time-based follow-up was intended to capture early temperature trajectories during the first hour after treatment in the ED.

2.5 Ethical Considerations

Firstly, this interventional study protocol was presented and consequently confirmed by the Committee of Scientific Research (CSR) at the College of Nursing/University of Baghdad, Iraq. The official agreement was obtained from Karbala Teaching Hospital for Children and the caregivers of the child were given verbal and written consent forms. Of equal importance, they were informed that involvement in the study is entirely optional and would have no financial or legal consequences, and that their child's information will be kept privately.

2.6 Statistical Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize demographic and clinical variables as well as temperature values at each time point. Given the repeated measurements over time, within-group changes in temperature across the five time points (pre-test, 15, 30, 45, and 60 minutes) were evaluated using the Friedman test. Between-group comparisons were assessed using the non-parametric Mann–Whitney U test at corresponding time points. Statistical significance was considered at $p < 0.05$, and effect sizes are reported alongside test statistics where applicable to support interpretation of clinical relevance.

3 Results

Table 1 summarizes demographic characteristics and clinical data for the two study groups. In both groups, the largest proportion of children were aged ≥6 years (45% in the antipyretic group and 51.7% in the vinegar compresses + antipyretic group). Males constituted the majority in both groups (61.7% and 65%, respectively). Intermittent fever was more frequently reported than continuous fever in both groups (65% in the antipyretic group and 60% in the vinegar compresses + antipyretic group). For fever duration, 43.3% of children in each group reported fever for 1–2 days. Feeling uncomfortable or tired was the most frequently reported associated symptom (40% and 36.7%, respectively), whereas vomiting and convulsions were comparatively uncommon. Prior hospitalization was reported in 80% of the antipyretic group and 73.3% of the vinegar compresses + antipyretic group.

Table 1: Distribution of Children According to their Demographic Characteristics and Clinical data in Each Groups

List	Characteristics in each group		Antipyretic		Vinegar compresses+ Antipyretic	
			F	%	F	%
1	Age (year)	2 – less than 4	7	11.7	9	15
		4 – less than 6	26	43.3	20	33.3
		≥ 6	27	45	31	51.7
		Total	*60*	*100*	*60*	*100*
		M±SD	4.5 ± 1.5		4.5 ± 1.5	
2	Sex	Male	37	61.7	39	65
		Female	23	38.3	21	35
		Total	60	100	60	100
3	Type of fever	Intermittent	39	65	36	60
		Continuous	21	35	24	40
		Total	60	100	60	100
4	Duration of fever	Last night	13	21.7	15	25
		1 – 2 days	26	43.3	26	43.3
		3 – 4 days	14	23.3	14	23.3
		5 days or more	7	11.7	5	8.3
		Total	60	100	60	100
5	Associated symptoms with fever	Vomiting	14	23.3	19	31.7
		Convulsion	15	25	15	25
		Uncomfortable/ tired	24	40	22	36.7
		Combination	7	11.7	4	6.7
		Total	60	100	60	100
6	Previous hospitalization	yes	48	80	44	73.3
		No	12	20	16	26.7
		Total	60	100	60	100
f: Frequency, %: Percentage, M: Mean, SD, Standard deviation						

Table 2 presents the distribution of axillary temperature across repeated time points within each group and the corresponding Friedman test results. In the antipyretic-only group, mean temperature decreased modestly over the 60-minute observation period (from 38.91 ± 0.53 °C at baseline to 38.17 ± 0.50 °C at 60 minutes). The Friedman test did not indicate a statistically significant change across time points in this group (χ^2 = 6.84, df = 4, p = .145), and the effect size was very small (.03), suggesting limited short-term change within the first hour under the measured conditions. In contrast, the vinegar compresses + antipyretic group showed a larger reduction in mean temperature over the same period (from 39.05 ± 0.54 °C to 36.87 ± 0.28 °C). The within-group Friedman test was statistically significant (χ^2 = 235.41, df = 4, p = .001) with a large effect size (.98), indicating a pronounced change across the repeated measurements. These findings support a descriptive pattern of faster early temperature reduction in the combined-intervention group; however, interpretation should remain cautious given the quasi-experimental allocation and the short follow-up window.

Table 2: Significant differences in temperature (°C) across time points in each groups

Temperature (C)		Descriptive Statistics				Friedman Test				
		M	SD	Min	Max	Mean Rank	X^2	df	p-value	Effect size*
Antipyretic	Pre-test	38.912	.5256	37.9	40.2	3.12	6.842	4	.145	.03
	Post-test 1	38.825	.5395	37.6	40.0	3.08				
	Post-test 2	38.543	.5027	37.4	39.7	2.95				
	Post-test 3	38.362	.5178	37.4	39.5	2.90				
	Post-test 4	38.167	.5007	37.2	39.5	2.95				
Vinegar Compresses + Antipyretic	Pre-test	39.053	.5407	38.3	41.0	4.97	235.408	4	.001	.98
	Post-test 1	38.543	.4496	37.5	40.0	3.98				
	Post-test 2	37.915	1.2972	37.0	47.4	3.00				
	Post-test 3	37.240	.2906	37.0	38.1	2.01				
	Post-test 4	36.870	.2848	36.3	37.6	1.03				

M: Mean of total score, SD: Standard deviation, Min: Minimum, max: maximum,
X^2: Chi-square, df: Degree of Freedom, P: probability

4 Discussion

4.1 Discussion of participant's demographic characteristics and clinical data

The demographic and clinical profile presented in Table 1 indicates broadly comparable distributions across the two study groups. The dominant age category in both groups was ≥6 years (45% in the antipyretic group and 51.7% in the vinegar compresses+ antipyretic group). This pattern is consistent with reports that febrile illness and related pediatric admissions remain common across childhood age ranges [21]. Male children constituted the majority in both groups (61.7% and 65%), which aligns with observations in prior pediatric service-utilization studies where males frequently represent a larger share of ED visits and hospitalizations [22]. Intermittent fever was more frequently reported than continuous fever in both groups, and most children had fever for 1–2 days. This clinical distribution is expected in an ED context in which viral syndromes and short-duration febrile illnesses are prevalent [23].Regarding associated symptoms, feeling uncomfortable or tired was the most frequently reported symp-tom, while vomiting and convulsions were less common. This constellation of accompanying symptoms is consistent with previous descriptions of pediatric fever presentations in acute care settings [24]. A relatively high proportion of children reported previous hospital admission in both groups. While this may reflect local referral patterns and caregiver health-seeking behaviors, the current study did not stratify outcomes by underlying diagnosis or past admission history. Therefore, these clinical characteristics should be interpreted as contextual information rather than explanatory factors for temperature response.

4.2 Discussion of significant differences in body temperature across time points in each groups in the pretest and posttest periods

The primary finding of this study is the observed reduction in axillary temperature over the first 60 minutes after treatment, with a larger decline in the vinegar compresses + antipyretic group. As summarized in Table 2, the antipyretic-only group showed a modest decrease in mean temperature from 38.91 ± 0.53 °C to 38.17 ± 0.50 °C over 60 minutes, and the Friedman test did not demonstrate a statistically significant change across time points. In contrast, the combined-intervention group showed a pronounced reduction from 39.05 ± 0.54 °C to 36.87 ± 0.28 °C, with a statistically significant Friedman test and a large effect size. This pattern is biologically plausible because combining a pharmacological antipyretic (central set-point reduction) with a physical method that increases heat dissipation could plausibly produce faster short-term temperature decline [25, 26].The present findings are broadly consistent with prior work comparing physical methods (including vinegar-based compresses and other sponging/tepid approaches) for acute fever management, where temperature decreases were observed after compress application [27, 28]. Studies examining similar time windows have reported that physical methods may contribute to early heat loss and more rapid declines when used alongside antipyretic therapy [29]. At the same time, the clinical significance of rapid temperature normalization should be interpreted in the context of child comfort, hydration,

underlying cause of fever, and the risk of excessive cooling; these outcomes were not systematically measured in the present study [30].Importantly, while within-group analyses support substantial change over time in the combined-intervention group, the quasi-experimental allocation and pragmatic ED implementation limit causal inference regarding superiority. Potential baseline differences, illness heterogeneity, and unmeasured confounders (e.g., fever etiology, prior medication exposure, and ambient conditions) may influence temperature trajectories. For this reason, the results should be interpreted as preliminary evidence that supports further confirmatory evaluation rather than definitive proof of comparative effectiveness. Future studies should use randomization and standardized intervention preparation, assess tolerability and skin integrity, and extend follow-up to evaluate recurrence and clinically meaningful endpoints [31, 32].

5 Limitations

This study has several limitations. First, the quasi-experimental design with purposive sampling and pragmatic allocation limits internal validity and prevents strong causal inference regarding comparative effectiveness. Second, the study was conducted in a single hospital ED, which may limit generalizability to other settings, age groups, and fever etiologies. Third, the follow-up period was restricted to 60 minutes, and outcomes beyond short-term temperature change (e.g., comfort, recurrence of fever, adverse skin effects, and caregiver acceptability) were not systematically assessed. Finally, intervention standardization details (e.g., exact preparation and concentration of vinegar compresses) should be more tightly controlled and reported in future trials to improve reproducibility and interpretation.

6 Conclusion

This study suggests that combining cider apple vinegar compresses with IV paracetamol is associated with a larger short-term reduction in axillary temperature during the first hour after treatment in the ED compared with IV paracetamol alone. Within-group analyses indicated a statistically significant temperature decline across repeated time points in the combined-intervention group, while changes in the paracetamol-only group were smaller over the same observation window. However, because the study used a quasi-experimental design and a short follow-up period, the findings should be interpreted as preliminary and hypothesis-generating. Further randomized and standardized studies are needed to confirm comparative effectiveness and to evaluate safety, comfort, and clinically meaningful outcomes.

7 Recommendations

Healthcare providers, particularly nurses, should be trained on evidence-based fever management and on the appropriate use of complementary physical measures as adjuncts to antipyretic therapy. If vinegar compresses are used, protocols should emphasize child comfort, avoidance of excessive cooling, and monitoring of skin integrity. Researchers are encouraged to replicate this work using randomized allocation, standardized compress preparation, and longer follow-up, and to include additional outcomes such as child comfort, recurrence of fever, and adverse effects to strengthen the clinical relevance of the evidence.

References

[1] Salgado, Patr´ıcia de Oliveira, et al. ”Métodos f´ısicos para tratamento de febre em pacientes cr´ıticos: ensaio cl´ınico controlado randomizado.” Revista da Escola de Enfermagem da USP 50 (2016): 823-830.

[2] Ma, Le-Le, et al. ”Fever and antipyretic supported by traditional Chinese medicine: a multi-pathway regulation.” Frontiers in Pharmacology 12 (2021): 583279.

[3] Oguz, Fatma, et al. ”Axillary and tympanic temperature measurement in children and normal values for ages.” Pediatric Emergency Care 34.3 (2018): 169-173.

[4] Longaray Fernandes, Gabriel, and Willian Roger Dullius. ”Non-pharmacological nursing management of pediatric patients with fever and hyperthermia: A systematic review.” Revista de Pesquisa: Cuidado

´e Fundamental 16.1 (2024).
[5] Wright, William F., and Paul G. Auwaerter. ”Fever and fever of unknown origin: review, recent ad-vances, and lingering dogma.” Open Forum Infectious Diseases. Vol. 7. No. 5. p. Offa132. US: Oxford University Press, 2020.
[6] Balli S, Shumway KR, Sharan S. Physiology, Fever. [Updated 2022 Sep 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from:, https://www.ncbi.nlm.nih.gov/books/NBK562334/
[7] Jose, Josna, et al. ”Effect of tepid sponging versus warm sponging on body temperature and comfort among under-five children with pyrexia.” Indian Journal of Pediatrics 89.5 (2022): 516-516.
[8] Sabbaj, Liliana. ”Knowledge and management of fever in parents of children under 5 years of age at a children’s hospital.” Archivos Argentinos de Pediatr´ıa 118(2) 2020: 89-94.
[9] Elseady, Ghada M., et al. ”Effect of an Evidence Based Protocol for Childhood Fever Management on Quality of Care Provided by Nurses.” Menoufia Nursing Journal 6.1 (2021): 147-156.
[10] Akyirem, Samuel, and Irene F. Bossman. ”Is tepid sponging more effective than paracetamol at relieving fever in febrile children in hot tropical climates? a mini review.” Ghana Medical Journal 55.1 (2021): 60-68.
[11] Villarejo-Rodr´ıguez, Mar´ıa Gloria, and Beatriz Rodr´ıguez-Mart´ın. ”Parental approach to the management of childhood fever: differences between health professional and non-health professional parents.” International Journal of Environmental Research and Public Health 16.20 (2019): 4014.
[12] De Martino, Maurizio, et al. ”Working towards an appropriate use of ibuprofen in children: an evidence-based appraisal.” Drugs 77.12 (2017): 1295-1311.
[13] Kamel, Fatemah, et al. ”Knowledge, attitude, and practice of paracetamol and ibuprofen administration among caregivers of the pediatric age group in Jeddah.” Cureus 13.1 (2021).
[14] Antono, Sumy Dwi. ”The Effectiveness of Warm Vinegar Compress in Lowering Children Body Temperature with Acute Febrile Illness.” Journal International of Science and Research (IJSR) (1820): 1-8.
[15] Gajewska, MAGDALENA, BEATA Bartodziejska, and A. Szosland-Faltyn. ”Use of fermentation processes to develop an innovative method for obtaining apple cider vinegar with health-promoting prop-erties.” Food Science Technology Quality 27.3 (2020): 77-86.
[16] Green, Cari, et al. ”Symptomatic fever management in children: a systematic review of national and international guidelines.” PloS one 16.6 (2021): e0245815.
[17] Taragi, S. Common cold, fever and its homeopathic management in pediatric age group. International Journal of Advances in Engineering and Management (IJAEM) 01 (6) 2024: 377-383.
[18] Serdar, Ceyhan Ceran, et al. ”Sample size, power and effect size revisited: simplified and practical approaches in pre-clinical, clinical and laboratory studies.” Biochemia Medica 31.1 (2021): 27-53.
[19] El-Naggar, Nahed, and Hoda Mohamed. ”Effectiveness of warm water footbath on temperature and fatigue among children with fever.” Evidence-Based Nursing Research 2.4 (2020): 202-212.
[20] Kandulna, Mr Ujwal. ”Effectiveness of Hot water foot bath on selected physiological parameters among patients with fever.”
[21] Schneuer, Francisco J., et al. ”Child characteristics and health conditions associated with paediatric hospitalisations and length of stay: a population-based study.” The Lancet Regional Health–Western Pacific 32 (2023).
[22] Ahmed Khalil, Amal, Hanaa Mohamed Nassar, and Amira Hassan Atta. ”Mothers’ management of their children with fever at primary health care centers in Port Said City.” Port Said Scientific Journal of Nursing 10.2 (2023): 203-218.
[23] Isa, Hasan M., et al. ”Fever assessment in children under five: Are we following the guidelines?.” World Journal of Clinical Pediatrics 13.1 (2024): 88864.
[24] Rockers, Peter C., and Margaret McConnell. ”Child gender and parental reporting of illness symptoms in sub-Saharan Africa.” The American journal of tropical medicine and hygiene 96.4 (2017): 994.
[25] Rahman, Azizur, and Md Moyazzem Hossain. ”Prevalence and determinants of fever, ARI and diarrhea among children aged 6–59 months in Bangladesh.” BMC pediatrics 22.1 (2022): 117.
[26] Valenzise, Mariella, et al. ”Retrospective analysis of fever in pediatric age: our experience over the last 5 years.” Children 11.5 (2024): 539.
[27] Gowsalya, S. A Study to evaluate the effectiveness of warm water foot bath therapy on reduction of body

temperature among children with fever in selected hospital, Perambalur. Diss. Thanthai Roever College of Nursing, Perambalur, 2019.
[28] Wilbert, J. ”Effectiveness of hot water foot bath therapy on temperature among patients with fever in SRM Medical College and Hospital, Kanjeepuram.” International Journal of Scientific Research 7.4 (2018): 382-385.

[29] Mohammed, Fathia Attia, and Elsayeda Ibrahim Ahmed. ”A comparison of vinegar compresses vs. cold water & water with vinegar for treating of fever at tropical hospitals.” International Journal of Nursing Science 2.4 (2012): 38-46.
[30] Basavaraj, Chetak Kadbasal, Shyamala Gowri Pocha, and Ravi Mandyam Dhati. ”Effectiveness of antipyretic with tepid sponging versus antipyretic alone in febrile children: a randomized controlled trial.” Journal of Nepal Paediatric Society 37.2 (2017): 129-133.
[31] Priya, D. Shanmuga, et al. ”Effectiveness of tepid sponging along with antipyretic drug versus only antipyretic drug in the management of fever among children–A randomized control trial.” Asian Journal of Pediatric Research 11.2 (2023): 6-16.
[32] Khaliq, Abdul, et al. ”Comparison between antipyretic and cold sponging versus only antipyretic in treatment of fever in pediatrics age group.” Journal of Medical Sciences 27.1 (2019): 3-6.