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RECENT TRENDS IN WOUND CARE HERBAL FORMULATIONS: META ANALYSIS AND SYSTEMATIC REVIEW

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ABSTRACT: Wound healing is a normal and common process that typically involves overlapping roles to increase normal activity by increasing neutrophils. The healing process can be managed by using natural substances that have therapeutic properties. The activity of numerous proteins and their regulation by genes orchestrate a healing performance like no other. The present study is to learn about the recent advances and groundbreaking research into herbal formulations for wound healing. Searching Scopus, PubMed, Science Direct, Cochrane Library, Medicine, and Google Scholar for herbal formulations of pharmaceuticals yielded the greatest results. Prisma analysis was used to identify exclusions in RCTs and cohort studies, while CMA performed a meta-analysis. Two reviews were rated on a 3-item, 5-point scale. Subgroup analysis is done to maximize competitive advantages to check for bias. Herbal wound healing formulations have 682 clinical studies. After duplication, 233 records were omitted from the result array, and 22 out of 89 articles were essential. Descriptive and analytical analyses of 16 clinical trials. Consider high, medium, and low bias risks to evaluate the original study potential. By the original study's conclusion, botany students will be more equipped to evaluate wound types, molecules, and potential for bias. Herbal and medicinal botany knowledge is necessary but not essential because the research does not center on therapeutic interventions. This study shows that you need to know about molecular biology to successfully use current herbal wound healing formulas.

INTRODUCTION: Wound healing can be considered a complex process because it facilitates recovering forms and functions of injured tissues. Complex growth factors represent the quality of wound healing with special reference to the release of cytokines in the wound site.

Numerous studies have taken place in this scenario about constructing antibacterial and procollagen synthesis for proceeding with the best outcomes¹. The medical properties of herbal compounds are considered to be the main constituents that can heal damaged tissues to an ample array.

These medicines are- alkaloids, essential oils, tannins, flavonoids, and saponins with special reference to wound healing promotions. Polyphenols play an important role in healing skin, which is further beneficial to increase the activity of natural products. This study aims at understanding some crucial aspect of the study that

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follows evidence of herbal formulation for mitigating the healing consequences. Skin is the largest body organ used to make up the outer covering of the living body. It is able to provide additional protection by restricting microbes' activity with the aid of light and injury^{2, 3}. In general, wound healing is a common and normal process that consists of overlapping and normal functions for enhancing normal activity by increasing the number of neutrophils^{4, 5}. The process of wound healing can be managed by medicinal properties present in natural substances. Genetic regulation and activity of different proteins play an important role by conducting a specific performance of healing properties.

This study also shows that phytochemical properties have a comparatively different aspect that can modulate the wound healing process by enhancing wound healing activity. *Curcuma longa*, Vitamin E, and honey have some active properties in this scenario for proceeding with the best result. Hydrophilic nature and photosynthetic properties play an important role in tropical dressing. 2% concentration of hydrophilic molecules can enhance the formation of different chemicals by enhancing the activity of herbal formulations^{6, 7}. Herbal formulation of drugs and tropical dressing is inversely proportional to each other because they can compile with the process of synthesizing collagen.

Quality of epidermal generation and healing process by transforming the level of growth factor can act as a supplementary process by which the production of polyethylene glycol becomes enhanced. This study focuses on performing a Prisma-based systematic review and meta-analysis of preclinical and clinical evidence of herbal formulation.

Types of Wound: Wound types determine the quality of formulation that needs to be applied for understanding meta-analysis and herbal formulation. An acute wound is considered to be a type of wound that can occur suddenly. The healing process for this type of wound proceeds with an expected rate; similar to a normal process of wound healing⁶. Contrarily, a chronic wound is a type of wound that does not change orderly. Predictable time is needed for the process of healing of this

wound that further needs 2-3 months for healing. It can be detained in one or more phases of the wound-healing process. Examples of these types of wounds are- pressure ulcers, ischemic wounds, diabetic foot ulcers, and arterial ulcers. It can be treated by removing dead tissues.

Other crucial types of wounds included in this context is- surgical wounds and burn wounds. A surgical wound can be defined as the incision or cut of skin made by a scalpel at the time of surgery. Types of surgical wounds are clean, dirty, clean-contaminated, and infected. To define the treatment of herbal wounds, it can be observed that *Aloe vera* has the highest efficiency for healing wounds^{8, 9}. The gel of this plant material consists of amino acids, polysaccharides, A, B, C, E enzymes that consist of sugar and minerals. Chronic and acute wounds can also be treated in this scenario by using these types of plants. Contrarily, burn wounds can be easily treated by cutting the blister forms of the wound and removing them from the area of injury¹⁰. Burn areas should be covered with a bandage to protect the wound from external contamination.

Wound Healing and Homeostasis: Homeostasis can be described as the structural tissue damage that has been processed due to activating response to the organism for maintaining stability and restoring the normal equilibrium process in this scenario. The immediate process of wound healing is considered one of the most crucial because it consists of the closing of blood vessels. The closing of the blood vessel is beneficial in this scenario because it proceeds with the aid of hypertrophy^{11, 12}. Different aetiology and anatomic locations are present regarding the process of wound healing. **Fig. 1** discusses the mechanotransduction process of wound healing.

This wound-healing process depends on the learning perspective of gene expression that the cell nucleus can conduct. Conduction of the nuclear regulation under this process more or less depends on the phases of the cell cycle. Phases of the cell cycle and the requirement of the S phase can complete the cell cycle for proceeding with the best result. YAP and the focal adhesion process of G action play an important role in this context for enhancing the activity of GTP ase.

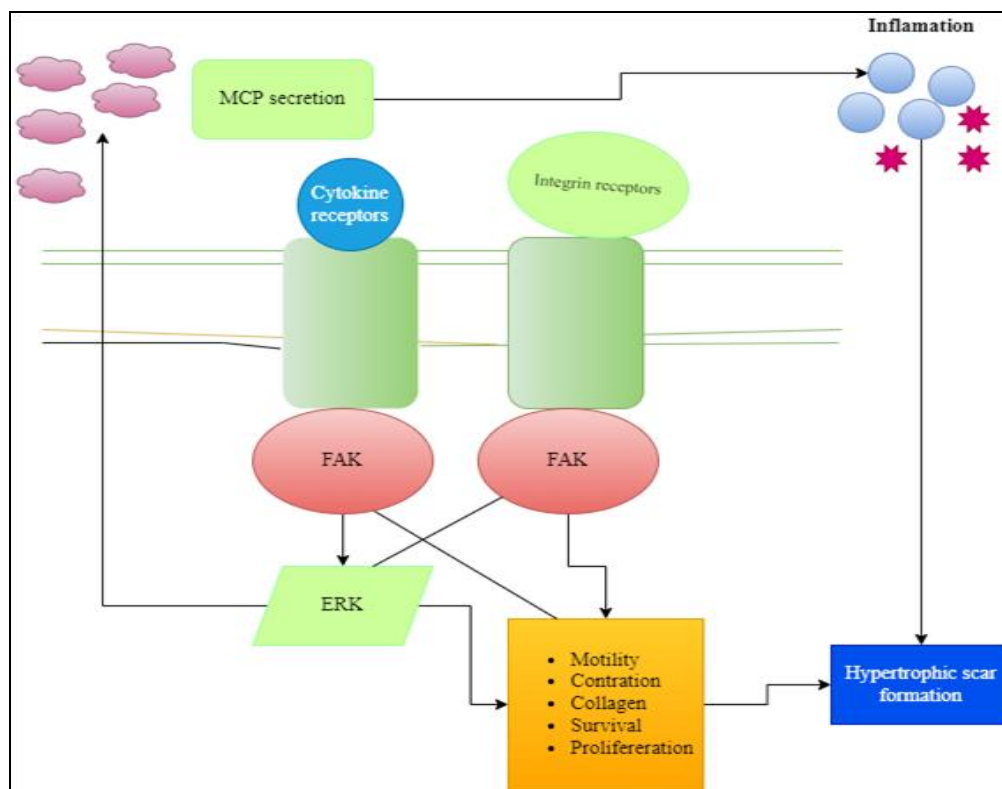


FIG. 1: MECHANOTRANSDUCTIONAL PROCESS OF WOUND HEALING

The activity of these enzymes plays an important role in providing the stability of the cytoskeleton and enhancing the LINE complex's ability to proceed with the best result. Moreover, another important wound healing regulation and hemostasis depend on the cellular transportation by which the ability of the KASH proteins is observed to be enhanced to an extent. Perinuclear space forming can be considered one of the beneficial aspects of this scenario because it can maintain correct hypersensitive responses in this scenario. The hypersensitive response is one of the helpful processes of regulating wound healing^{4, 13, 5}. Cells migration and the ability to maintain disintegration of the line complex helps get the best result. Cell cycle also depends on the interaction with the line complex, which is required to enhance a multifactorial process to an extent. The LINE complex is considered one of this scenario's most important aspects. Mechanical regulation and cell proliferation by the activation of damaged tissues can maintain the homeostasis process, which is beneficial for maintaining the transcriptional regulation activity. The release of PDGF and EGF is needed for cell-associated sorting and formation to proceed with the best result. Proliferation remodeling and also the process of Scar healing are dependent on the process of traditional therapy.

Types of Herbal Formulation: The wound healing process in the present day is considered to be enhanced by the application of *Aloe vera* and *Curcuma longa*. An in-depth and detailed process of analysis of recent trends of herbal formulation indicates that *Aloe vera* can act as the best polyherbal medicine because it has a comparatively high value for the liquid formulation. Antibacterial ointment and turmeric paste are the best options for treating wounds to an ample extent⁷. Garlic and a mixture of coconut oil can act as the best process of wound healing in this scenario. Moreover, a mixture of calendula and marshmallows can be integrated for enhancing the ability of an individual to fight chronic and surgical wounds⁷.

The multifactorial process of wound healing needs some essential cofactors that can be further enhanced by protein synthesis of the capillary wall and the neutrophil formation by which angiogenesis takes place. The traditional and modern formulation of *Aloe vera* includes glycosides, polysaccharides and saponin complex that intermingle with phytol, oleic acid and anthraquinones. The inclusion of anthraquinone can be done by making a more sustainable response further integrated with antimicrobial activity¹⁴. The inclusion of Ginseng is considered beneficial

in this scenario because it can enhance the immunity power after the infection is caused at the time of wound healing.

Herbal Formulation from Cellular to a Molecular level: In order to discuss the herbal formulation at the molecular level, it has been understood that the formulation is more or less dependent on the activity of the transcriptional gene regulation^{11, 9}. The YAF gene plays an important role in this seniority because it can restrict ligands responsible for hazards occurring after the post-wound healing. In recent times, it has been observed that liquid formulation needed the process of vasodilation, which is responsible for the enhancement of TOR signaling^{5, 15}. The TOR signaling enhancement is considered beneficial in this scenario because it can form epithelial cells. Figure 2 discusses the wound healing process by an herbal formulation that acts as the main theme for enhancing the ability to increase the PDGF factor for proceeding with the best result¹⁶. Moreover, a PDGF factor is considered to enhance the regulation of kinase activity by which the TGF-beta factor does not activate for restricting MMP activity. The fiber clot's systematic formation is considered because it can repair bioactive matrix fragments. In the natural extracellular matrix, inflammation and oxidative damage depend more or less on the activation of TNF alpha with the aid of infiltration of lymphocytes.

MATERIAL AND METHOD: Entire research work has been done through the process of the meta-analysis by which calculation of the further change can be easily traced in this scenario. Moreover, a crucial part of this review is extraction by the process of plant material³. The inclusion of the plant material is constructed by maintaining the herbal pathway. Construction of the herbal pathway and enhancing the rules and regulations is beneficial in this scenario because the plant-derived product can manage wounds.

A Study from the Plant Material: It uses *Centrella asiatica*, *Aloe vera* and journals collected from PubMed, and Google scholar for proceeding with the best outcome of result. It has been observed that an Accelerated solvent extractor is needed in this scenario to proceed with the best result. Pharmacol evaluation and inclusion of the

organoleptic characters involves macroscopic and microscopic studies in this scenario¹⁷. Ash value and fluorescence analysis have been considered for this study by maintaining the standard protocol¹⁵. Maintenance of the standard protocol and enhancement of quantitative microscope studies indicates that including micrographs is beneficial for enhancing the perspective of systematic learning in this scenario. Moreover, the analysis also shows that a macroscopic study included leaves stipulated, and the leaf size of the material is not excluded from the reproduction of stolon.

Collection of Data: PubMed, Science direct and google scholars are searching for the mechanism or the pharmaceutical activities in this scenario because these two are popular databases. Numerous articles have been chosen for proceeding with the data analysis¹¹. The pharmacological function of the drugs with their herbal formulation has been considered for the best result.

Quality Assessment and Risk of Bias: Two significant reviews have been assessed in this scenario by judging a three-item five-point quality scale. A subgroup analysis regarding the risk of bias has been assessed in this scenario to enhance the competitive advantages to an extent. Moreover, the analysis also shows some groups of meta-analysis with wound healing activity. Data exclusion has not been done in this scenario because of a lack of data. This meta-analysis consists of randomized controlled trials and cohort studies^{13, 15, 14, 18}. Treatment, measurement, and end of treatment are three consecutive aspects needed for completing a meta-analysis and managing quantitative protocols.

RESULTS:

Commonly used Herbal Medicines in COPD: The frequency of herb medicines in this scenario indicates that 176 clinical trials are presented in their project. The data's incomplete outcome includes identifying the records from the database search and proceeding with selective outcome reporting. Control intervention of the inclusion and exclusion criteria has also been performed in this context to proceed with the best result outcome. Value for the western medication and acute exacerbation on the stable stage has been discussed in this scenario for a valuable outcome.

TABLE 1: META-ANALYSIS OF THE STUDY INVOLVED WOUND HEALING HERBAL FORMULATIONS

Studies	Diagnosis	Application	Control groups	Outcome
Rosińczuk et al. 2018 ¹⁶	SCOPD/I~II AECOPD/I~III AECOPD/NA	Decoction of Chinese herbs+ WM Bufe-Yishen-Huayu decoction+WM Extraction of Chinese herbs and injection process	Placebo+ WM Theophylline and routine medication with a daily checkup of the wound to manage clinical symptoms	Clinical symptoms of the wound occurrence involve exacerbation of the wound healing process and exclusion of patient scale of satisfaction
Sharma et al. 2021 ¹⁷	Diagnosis by <i>Centella asiatica</i> , <i>Curcuma longa</i> , <i>Sphagneticola trilobata</i>	Physical and normal dressing, the multifunctional natural wound healing process, herbal formulation for the treatment of tropical wounds	Inclusion of macro nanofiber with alginate-based titanium fiber mesh and composite form of dressing	Innovation outcome includes a synergistic, new herbal composition that consists of a therapeutically efficient effect of quantity which one was obtained from Hamil Tonia, <i>Curcuma longa</i> and <i>Azadirachta indica</i> . The Multifunctional and natural wound healing process contain a healing wound with organic silver nanoparticles. It consists of a Chitosan with a comparatively low zwitterionic value. These values are included in the form of ingredients that consists of a synergistic impact
Alasbahi and Groot, 2020 ¹⁸	Topical application of the crushed leaves with the aid of burn wounds and powered cuttlebone. Rinsing of wounds has proceeded with the fact of a potential diagnosis that acts as a healing factor of the wounds. Wound healing factors comprise another array of diagnoses that consists of topical applications of crushed peels in burn wounds. Potassium aluminium sulphate has been used with the aid of an internal shell.	Application of these extracts has been performed at the stage of acute inflammatory response with the aid of the mechanism of the phospholipase. Infusion activity has been performed in this scenario.	WM	Desired outcome has been performed in this scenario that is oriented by the process of purified protein and extraction process of saponin. Therefore, the outcome of this study shows that the formation of the glycoprotein complex has a crucial role in maintaining the lectin fraction. Knowledge and the side effects of this study are crucial in this scenario because health professionals can use it as a topical application for proceeding with the best result. Wounds occurred by dermatitis have a crucial aspect that is obtained in this scenario
Kim et al. 2019 ¹⁵	Pharmacokinetics and the application of drugs. Enhancement of dose efficiency.	The skin at the wound site	WM	Improvement of the quality observed with the enhancement of the regulatory functions
Shukla et al. 2018 ¹⁴	Acute application of the herbal drugs	The internal region of the body to examine the activity of internal injury.	WM	Internal injury has been associated with the effect of PR-AKI. Pooled results are based on the random model effects that show 2.4% with 95% CI 1.3%-4.2%. Seeds of this plant have high efficiency of wound healing activity in both control and standard treatment. In the case of the incision model, the application of the topical array has been done by enhancing the clarification of the breaking strength
Ali et al. 2022 ¹⁹	Hydroalcoholic extract of <i>Moringa oleifera</i> seeds	In vitro antioxidant activity has been performed in this scenario	Fibroin cell culture	The standardized mean difference has a 95% confidence with appetite SMD: 0.81 95% CI. Nausea and vomiting included formulation of the risk of bias and indirectness of immunodeficiency
Marui et al. 2019 ¹¹	Palliative medicine is included for formulating the process of understanding screen precision	Nine studies have completed risk understanding the process of risk of bias	A total of 1561 participants has been considered for the study that consists of	

Sharifi et al. 2020 ⁶	Use of traditional medicine by the application of ε-caprolactone and MTT assay. The inclusion of this essay includes PLA 8% and PCL 10%	Double nozzle electrospinning tool for wound healing technique.	development and imprecision. Optimum scaffold with 20% beads	Nanofibers can enhance the perspective of the biological property of wound healing without making it toxic
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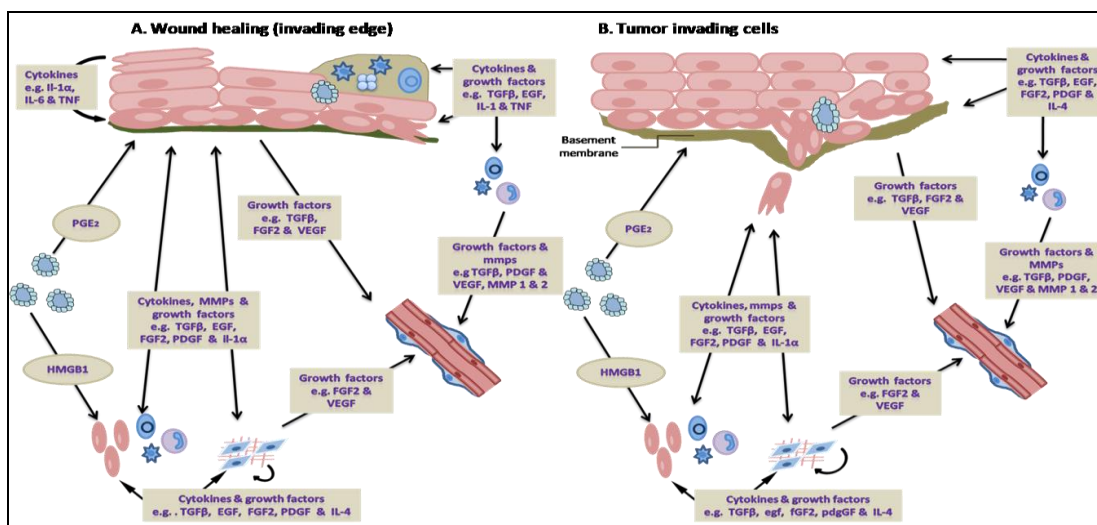


FIG. 2: PROCESS OF WOUND HEALING BY HERBAL FORMULATION

TABLE 2: FRAMEWORK OF THE RISK OF BIAS OF THE ANALYSIS

Article	Sequence generation	Allocation concealment	Binding of participant concealment	Binding of outcome assessment	Incomplete data outcome	Selective outcome reporting	Other bias sources
Rosińczuk et al. 2018	+Low	?Un	?	?	+	+	+
Sharma et al. 2021	+	+	+	?	?	+	+
Alasbahi and Groot, 2020	+	?	+	+	?	+	?
Kim et al. 2019	+	+	+	+	-High	+	+
Liu et al. 2017	?	+	?	+	+	+	-
Ali et al. 2022	+	+	+	?	+	+	?
Schreiber et al. 2018	?	+	+	+	+	+	?
Sharifi et al. 2020	+	+	?	+	+	+	?

Consequences of the Clinical Trials: Out of the 176 paper’s clinical trials, the risk of bias-associated eligibility becomes fully assessed. The inclusion of n=18 articles has done this quantitative synthesis. Therefore, it can be said that the herbal formulation for wound healing has been properly explained in this scenario to an ample assortment. Moreover, it also represents the implementation of herbal formulation of the wound healing process. The implementation process of wound healing also

portrays that n=15 of the results proceed for the meta-analysis. Therefore, the qualitative synthesis and process of the meta-analysis are considered to be beneficial in this scenario by the arrangement of the risk of bias test. To describe the risk of the bias assessment tool, the first and foremost requirement is related to the exclusion of an overrated or blank result in article²¹. The study indicates that 158 clinical trials are excluded in this scenario. Out of that, four clinical trials are excluded in this context,

indicating the same results as the clinical trials. Moreover, it also indicates that lack of pulmonary functions and trial randomization are the bad consequences of the result. On the other hand, high-quality meta-analyses and the same clinical trials can clash with each other. Overview of the blank clinical trials has been equally assessed in this scenario for sufficing with the best outcome. Pulmonary trials are also associated with this scenario, which is needed for the analysis part, where it also enhances the integrity level of herbal formulation. Results indicate that this scenario needs adjacent therapy of the heterogeneity to understand the outcome of the result. Contrarily, HM has no advantage in improving the wound level in this scenario. Five high-quality trials are important for the study that indicates arterial data for the blood gas. This study indicates that reduction of the PaCO₂ level benefits working as the adjacent therapy.

Character of the Study Included: A detailed method of discussion has been discussed regarding

wound management, preparation of the risk of bias and going with the process of sequence generation, allocation concealment, blinding of participant concealment, the incomplete outcome of data^{13, 5, 15, 14, 18, 19}. The selective outcome of the reporting and some other biases has been performed in this context which is the main theme for completing this analysis. Quality of life assessment and symptoms assessment was done for this review.

Database: Scopus, Cochrane library, medicine, and PubMed have been used for conducting this study to proceed with the best result outcome. Moreover, the analysis has discussed HM intervention and the inclusion of preparation containing multiple herbs. CMA software has been used in this scenario for the meta-analysis.

Meta-analysis Test: The Fig. 3 discusses the meta-analysis of this present study. In the case of the first article, the odds ratio indicates a significant difference between the lower and upper limits. The lower limit is 0.863, and the upper limit is 16.686.

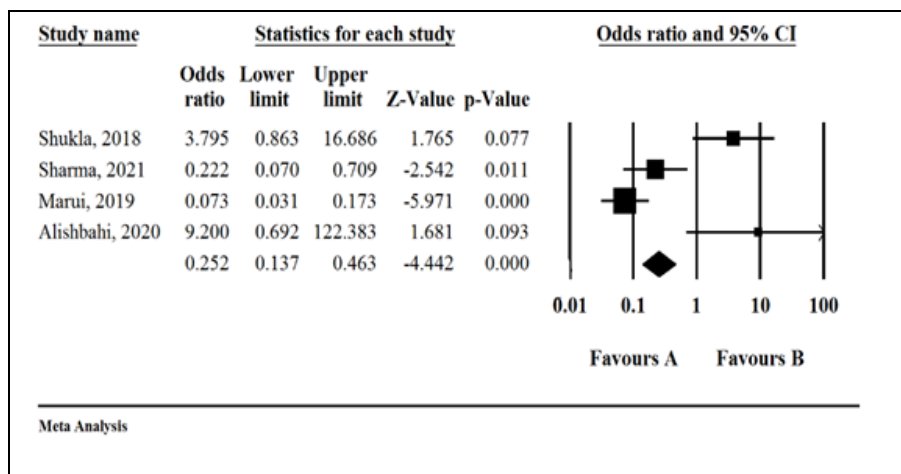


FIG. 3: META-ANALYSIS TEST FOR SELECTED STUDY

Therefore, it can be observed that the Z value is 1.765, and the p-value is 0.077. The odds ratio has been calculated by 95% of the coincidence in this scenario²⁰. From the above, it can be concluded that in recent herbal formulations for wound healing, these herbal medicines are subjected to mandate standards and regulated like medicines.

It leads to integrating herbal medicines into modern medical practices by considering both efficacy and safety parameters.

Description of the Prisma Analysis: This study is related to the Prisma analysis and described a good

inclusion and exclusion of the clinical aspects Fig. 4. The study included an array of studies from Scopus, medicine, PubMed, Cochrane, and springer. These links are important in this scenario for proceeding with the best result. A total number of 682 articles have been collected in this scenario which consists of a large extent of the clinical trials regarding the herbal formulation of wound healing²¹.

Therefore, the herbal formulation of wound healing is more or less depends on the learning perspective of actual knowledge regarding the enhancement of

present-day medicine. Out of that 233 records have been excluded in this scenario to understand the array of the result. This exclusion has taken place due to the presence of duplicate journals. After proceeding with this removal, eligibility of the full-text articles becomes limited to 382. Apart from that, a total number of 127 articles were recorded

for the screening process. The screening process results in a negative result that is beneficial for explaining all of the consequences of the herbal formulation of wound healing. In most articles, a proper screening procession has been identified to an array that resulted in the inclusion of rest trials in the study.

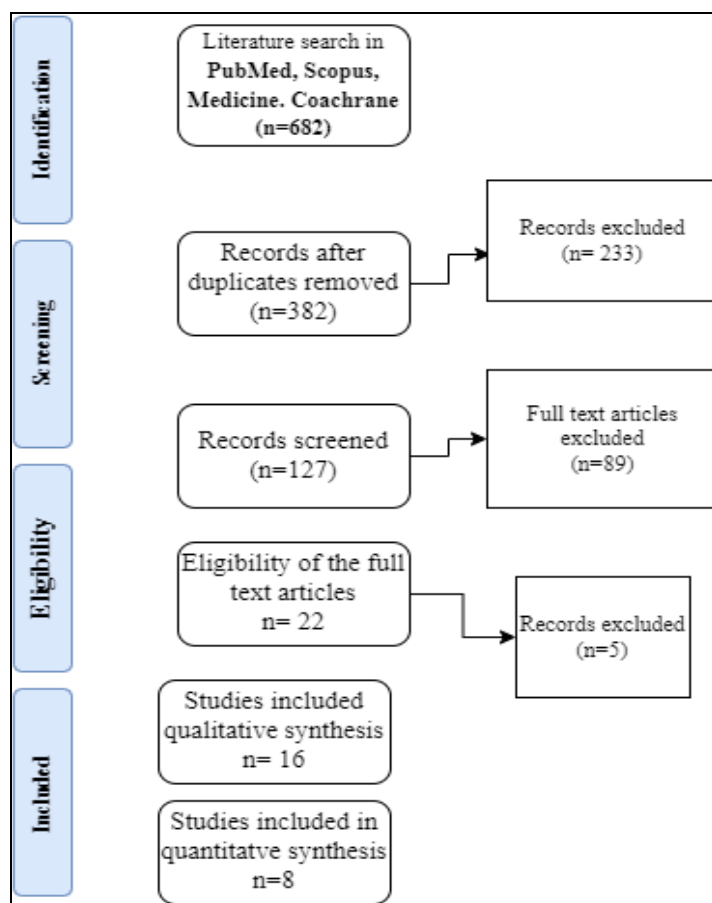


FIG. 4: FLOW CHART OF THE SYSTEMATIC REVIEW BY THE PRISMA ANALYSIS

Moreover, another important aspect indicates that out of 89, only 22 articles are important for the outcome. The therapeutic effects of the multiple herbal formulations indicate that the Prisma analysis is needed to counter qualitative and quantitative studies^{22,23}. Qualitative and qualitative studies are beneficial for understanding a depth overview of the study. Sixteen clinical trials have been undertaken for the qualitative analysis of the study, whereas eight trials have been used for the quantitative analysis of the study.

Risk of Bias for these Studies: The table discussed regarding the risk of bias consists of high, medium, and low risk that is required for analyzing the study's potential. Moreover, the analysis also shows that commonly used herbal

medicine needs to be reported and agreed properly with every outcome that can maintain oral administration and outcome from the subgroup analysis 6, 2. The outcome from the subgroup analysis shows that different aspects of SCOPD symptoms are beneficial for enhancing % of FEV to an ample extent. The activity of the impact score can be considered beneficial for conducting this study [8, 1]. The overall effect of baseline with the ability of chronic wound management has the level of heterogeneity $I^2 = 0\%$.

The above study discusses the systematic analysis of forest plots which is about making a study significant. This forest plot analysis includes biasness that can be changed with the formulation of a mixed diagnosis. Pressure ulcers and diabetic

foot ulcers consist of modern treatments that can be proceeded with understanding molecular characterization^{18, 10, 14}. Molecular characterization of the herbal formulation depends on the risk of bias that positively regulates the thinking and learning perspective of managing wounds. Causal therapy of wound management is considered to be beneficial in this scenario. In various articles, a detailed method of analysis is done to manage the risk of bias for the present study.

Herbal Monopreparation: Ginseng is included in the systematic review, which is important to conduct with a systematic process Placebo-controlled. The placebo-controlled process is considered to be beneficial in this scenario because it consists of a crossover design with a comparatively strong baseline activity. The baseline activity is checked by the process of meta-analysis and shows that ginseng berries can be used for this study to avoid infection. Maintenance of the irradiance level is considered to be one of the main themes of this study, by which binding outcome assessors can proceed with selective reporting to get the desired outcome. Result of the meta-analysis and risk of bias; it can be determined that the external process of the treatment needs further processing and exposure to the herbal formulation.

Studies from Different Databases: Wound healing formulation has been discussed in detail regarding multifarious databases that are beneficial for enhancing an individual's potentiality for fighting wounds. The wound can be managed in this scenario by which integrated cellular and biochemical events are traced. Reports from various studies show that the plant has the potential to fight against starvation^{4, 13, 5}.

Polyherbal formulation of rats has been discussed in detail which is taken into consideration for enhancing the ability of the drug to an ample extent. Moreover, the study also shows that the significant medical burden manages chronic wound induction as the patients are observed to go with multifarious distress in this scenario. The development of the new evidenced technologies has a significant validity that is beneficial for enhancing the competitive advantages of herbal formulation.

DISCUSSION: After completion of the meta-analysis of the study, it can be understood that the incision model and application of the topical is considered one of the most crucial facets in this scenario. Treatment of the incision model and application of enhancement of clarification depends on the thinking and the learning perspective of the control standard of the formulation. The formulation has a concrete standard that follows precision screening^{24, 25, 26}.

After completing the meta-analysis, a clear and concrete viewpoint can be understood in this scenario regarding measuring the effect of PR and AKI. Measurement of AKI consists of a modern view in this scenario that is aligned by an array of natural resources. The inclusion of natural resources has a role in enhancing the growth factor of secondary ridges, which is prominent for showing morphological abilities. These morphological abilities play a wide role in acting as the precursor of herbal formulation. The precursor of the herbal formulation consists of correct identification regarding the compressed ability of the resources. Meta-analysis of the study also shows that risk is comparatively low by maintaining the acute application of herbal drugs. Moreover, dose efficiency plays an important role in enhancing regulatory function by which internal injury can be easily avoided. The outcome of this study also shows that a crucial role in maintaining lectic function is one of the essential aspects in this scenario^{27, 28}.

Herbal formulation and application of crushed peels can maintain regulatory function by which the kinetics of a disease can be easily determined^{15, 25}. The study's risk of bias shows that it consists of a range of learning perspectives which is beneficial for the enhancement of clinical trials. As the study included 176 clinical trials, then it can be said that all of these clinical trials need to be valid and tested by the molecular technique for understanding herbal formulation for wound management.

CONCLUSION: After conducting this study, it can be said that recent trends regarding the herbal formulation of wound healing require prudent knowledge in molecular biology to proceed with the best result. Moreover, the analysis also shows that the risk of bias assessment and discussion from

the Journal is important for grasping the fundamental knowledge of the medical healing process. As the study does not focus on the medical healing process, sound knowledge of herbal and medical Botany is crucial in this scenario. After completing this study, it can be said that an individual can interpret wound types, molecular formulation and risk of bias technique.

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