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LADY AMRITBAI DAGA COLLEGE FOR WOMEN OF ARTS, COMMERCE & SCIENCE AND SMT. RATNIDEVI PUROHIT COLLEGE OF HOME SCIENCE & HOME SCIENCE TECHNOLOGY

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EDITORIAL

It's a matter of great pleasure to present the 18th volume of Research journal of our institute which has received ISSN registration, under the category of 'Research journal'.

This issue features the work of authors, from the field of Cosmetic Technology, Applied electronics and Software Technology, Interior Design, Hotel Management and Catering Technology and Human Development. Considering the diversity of topics the current issue is classified in different sections because authors are from undergraduate, postgraduate and research field.

The first research paper which is from Cosmetic Technology, focused on the physicochemical and phytochemical investigation of the stem bark of Albizia lebbeck (L.) Benth. The results from this study offer valuable insights into the standardization and identification of Albizia lebbeck stem bark for potential use in skin care formulations. This investigation contributes to the standardization process and helps verify its authenticity and safety for application in skin care cosmeceuticals. The findings support the extract's potential for use in therapeutic formulations aimed at improving skin health. A well-researched article from Applied Electronics and Software Technology discussed in their paper about a surveillance Camera car using ESP 32 cam module that contains in-built Wi-Fi and Bluetooth to control the camera car that works in any smartphone using an IP address. The surveillance car is aimed to provide streamlined user experience to each one of them. This project covers the aspect of human need for surveillance. It provides efficient and easy motion of the car that can cover large areas in a small amount of time. The project can easily be customized according to one's needs. Hence it can be used anywhere from house to offices and schools. The project is built inexpensively and made sure that it can be easily accessible by any user. Which makes it user friendly. Third author from Interior designing field writes on 'The Role and Implications of Contextual Factors on Outcomes of Transferred Interventions in Urban Mobility' This paper attempted to address the following through an illustrative case study method: firstly, the manifestation and rationale of transferability of measures in urban transport planning across geographic boundaries. Secondly, it examined the ramifications of adopting transferred interventions thereby eliciting factors which influence their outcomes. Thirdly it is clear from the cases presented that a transferred measure will not have the same degree of success as it had in its place of origin. This indicates the need to consider the nature and character differences of a recipient city and a donor city for a transfer which should be thoroughly understood.

Our fourth and fifth papers are from Human Development. They focussed on Stress of Parents of Intellectually Disabled Children. The findings of the present study from statistical treatment an analysis of the data revealed the following: The parents of intellectually disabled girls have more stress than parents of mentally retarded boys. Ordinal position of the intellectually disabled child failed to influence the stress level experienced by the parents of intellectually disabled children. The authors had some recommendation and suggestions which are discussed in detail in their paper. The fifth paper, Explored the Impact of Introversion and Extroversion on Self-Esteem of adolescents. They found, adolescents with extraversion as their personality trait were found to have higher self-esteem and sixty percent of adolescents revealed low levels of self-esteem.

Further three papers are from the Cosmetic Technology field. India is the largest tea growing country in the world. It was concluded in the sixth paper that black tea is an effective skin care ingredient due to its enriched polyphenols profile, an ultimate antioxidative entity and therefore it is beneficial for skin care, comparatively safe, produce less toxic and adverse reactions', next to water. Black tea is an effective skin care ingredient due to its enriched polyphenols profile, an ultimate antioxidative entity and therefore it is beneficial for skin care, comparatively safe, produce less toxic and adverse

reactions. The seventh review article says that, Face acids have emerged as a cornerstone in modern skincare products. This comprehensive review delves into the diverse range of face acids, including alpha-hydroxy acids (AHAs), beta-hydroxy acids (BHAs), poly-hydroxy acids (PHAs), and others, to evaluate their efficacy and mechanisms of action. The evidence suggests that when used appropriately, these acids can enhance skin texture, promote cell turnover, and address issues such as acne, hyperpigmentation, and signs of aging. Our eighth paper, reviews Biodegradable emulsifying agents for cosmetic preparations. Biodegradable emulsifying agents can break down into simpler, environmentally friendly substances. This property reduces the accumulation of persistent pollutants in ecosystems. The study reveals the fact that Biodegradable emulsifiers tend to be less toxic compared to their non-biodegradable counterparts, reducing potential health risks and proving effective even at low concentrations. Additionally, they assist companies in achieving sustainability goals and adhering to regulations that favour eco-friendly ingredients.

Ninth paper is from the field of masters in Hospitality Management which studied the 'Effects of stress on eating behaviours of college going students' The selected age group is from 18 to 25 years. The paper says several factors contribute to the relationship between stress and eating behaviours. Social and environmental factors also play a role. Overall, understanding the effects of stress on eating behaviours is essential for promoting the health and well-being of students.

Last two papers are again from Cosmetic field. Tenth paper discussed the Artificial Intelligence in Dermatology; Advances in Skin Cancer Diagnosis: A Review. It is concluded with the fact that, AI in skincare represents a significant move toward tailored, data-driven solutions that benefit both customers and healthcare providers. The use of artificial intelligence in skin cancer diagnostics is a significant leap in dermatology, with the potential to improve outcomes, lower healthcare costs, and increase access to early detection. Attention to ethical, regulatory, and practical problems will be required to fully incorporate AI into clinical practice in a way that optimizes its benefits while avoiding its drawbacks. Last review article is on the Role of Bicelle Beads in Modern Cosmetic Formulations. Bicelle beads are capable of encapsulating both hydrophilic and hydrophobic compounds, which makes them versatile in cosmetic applications. It is concluded with the fact that, So offering enhanced stability, deep penetration, and efficient delivery of active ingredients. Their unique disc-like shape provides a distinct advantage by preventing agglomeration and improving structural integrity. The customizable nature of bicelle beads allows for tailored formulations to meet specific cosmetic needs, making them versatile in applications ranging from moisturizers to anti-aging treatments and sunscreens.

Dr. Sangeeta Sahasrabuddhe
Editor-in-Chief
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Contents Page No.

Evaluation of Albizia lebbeck Stem Bark for Standardization and Phytochemical Analysis in Skin Care Applications

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Abstract

The present study focused on the physicochemical and phytochemical investigation of the stem bark of *Albizia lebbeck* (L.) Benth. The powdered stem bark was sequentially extracted using six different solvents in the following order: petroleum ether, chloroform, isopropyl alcohol, acetone, ethanol, and water, progressing from non-polar to polar. Phytochemical screening revealed the presence of secondary metabolites, with the highest concentrations found in the aqueous and ethanolic extracts, followed by the acetone, isopropyl alcohol, chloroform, and petroleum ether fractions. The physicochemical properties, including moisture content, ash values, and extractive values, were also evaluated to provide a comprehensive profile of the stem bark. The results from this study offer valuable insights into the standardization and identification of *Albizia lebbeck* stem bark for potential use in skin care formulations.

Keywords : *Albizia lebbeck*, secondary metabolites, phytochemical analysis, physicochemical properties, solvent extraction, skincare.

INTRODUCTION

The increasing interest in natural ingredients for skin care products has driven research into the physicochemical and phytochemical properties of various plant extracts. In recent years, numerous cosmeceutical products have been launched in the market. Cosmeceuticals are products that combine cosmetics and pharmaceuticals, applied topically as cosmetics yet containing ingredients that can influence the skin's biological function [1]. The use of plant extracts in cosmeceutical formulations has gained popularity due to their potential safety advantages over synthetic ingredients [2]. *Albizia lebbeck* (L.) Benth., commonly known as the Lebbeck Tree, is a significant medicinal plant from the Fabaceae family, widely used in traditional medicine for its therapeutic properties. This large, deciduous tree is native to India and grows up to an elevation of 900 meters in the Himalayas and the Andaman Islands [3].The stem bark of *Albizia lebbeck* has been traditionally used for its anti-inflammatory, antioxidant, antibacterial, and anti-allergic properties [4]. Ayurvedic texts frequently recommend the use of *Albizia lebbeck* for treating skin disorders, promoting wound healing, and reducing inflammation [5]. The bark contains various bioactive compounds, including flavonoids, tannins, and saponins, which contribute to its medicinal benefits, particularly in the management of wounds and burns [6].

Given the rich presence of these active components, this study focuses on the physicochemical and phytochemical investigation of *Albizia lebbeck* stem bark. The sequential extraction of the powdered stem bark using solvents of varying polarities aims to provide a comprehensive analysis of its chemical profile. The results of this study will contribute valuable data for the standardization and identification of *Albizia lebbeck* stem bark, supporting its potential application in skin care products.

MATERIALS AND METHODS

Authentication of Plant Material: The stem bark of *Albizia lebbeck* was collected, identified,

and authenticated at the Department of Botany, RTMNU, Nagpur, under herbarium sheet no. 10598.

Determination of Physicochemical Parameters: Determination of various Physicochemical parameters such as Moisture, Total ash, Acid insoluble ash, Water soluble ash, Water soluble extractive value, and Alcohol soluble extractive value were determined as per Ayurvedic Pharmacopoeia of India and standard research papers [7,8, 9]. The plant material of *Albizia lebbeck* was shade-dried for about 15 days. The dried sample was then powdered in a pulverizer. The obtained powder was then used for physicochemical analysis.

Preparation of Extract of Albizia lebbeck (L.) Benth Maceration: Powdered material of *Albizia lebbeck* (L.) Benth. stem bark (AL) was subjected to maceration with 100 ml of six different solvents in the following order, from non-polar to polar: petroleum ether, chloroform, acetone, isopropyl alcohol, ethyl alcohol, and water. The maceration process was conducted for 15 days at room temperature, with vigorous shaking every 24 hours. The stem bark extracts were then filtered using normal filter paper and stored in amber-colored bottles for preliminary phytochemical analysis.

Preliminary Phytochemical Investigation of Stem Bark: Preliminary phytochemical screening was conducted following standard procedures [10, 11, 12, 13, 14, 15]. As per the protocol, the crude plant material was subjected to the solvent extraction method. The sequence of solvents used for extraction, from non-polar to polar, was petroleum ether, chloroform, acetone, isopropyl alcohol, ethanol, and water. Each solvent was used for separate extractions to ensure optimal extraction of specific active constituents. The presence of these constituents was confirmed through standard chemical test methods. The extraction results indicated that the polarity of the active constituents corresponds with their respective solvents, while traces of these constituents also provided qualitative test results.

RESULTS AND DISCUSSION:

Organoleptic characteristics of Stem bark powder of *Albizzia Lebbeck* (L) Benth: The stem bark powder of *Albizia lebbeck* is brownish in colour with a sweetish to aromatic odour and slightly astringent taste. Observation of organoleptic characteristics of stem bark is provided in Table No. 1.

Table No. 1: Results of Organoleptic Characters of Stem Bark Powder of *Albizzia Lebbeck* (L) Benth

Sr.No.	Characters	Observation
1.	Colour	Brownish
2.	Odour	Sweetish to aromatic
3.	Taste	Slightly astringent
4.	Touch	Slightly rough

Physicochemical Parameters of stem bark: Results of physicochemical parameters of stem bark are provided in Table No. 2.

Fig.1 a) *A. lebbeck* stem bark b) Powdered AL sample c) Filtered extracts with six solvents

Table No. 2: Results of Physicochemical evaluations of stem bark of Albizia Lebbeck Benth

Sr. No.	Parameters	Values Obtained (%)	Values in API (%), Part-I, Volume. III
1.	Loss on Drying at 105°	6 %	5.525 ± 0.306 %
2.	Total Ash	8.48 %	Not more than 8 %
3.	Acid-insoluble ash	0.49 %	Not more than 1 %
4.	Water soluble ash value	2.79 %	Not more than 3 %
5.	Water Soluble extractive	16.88 %	Not less than 6 %
6.	Alcohol Soluble extractive	22.93 %	Not less than 12 %

The authentication of plant material was proved through the physicochemical characteristics of the plant material. The percentage of weight loss on drying or moisture content was found to be 6%. The less value of moisture content could prevent bacterial, fungal, or yeast growth. Ash value is an important tool used to determine the authenticity, purity and standardization of drugs. Total ash was found to be 8.48%. Acid insoluble ash represents the presence of silica and silica impurities. Acid insoluble ash was found to be 0.49%. Water soluble ash value was found to be 2.79%. Water soluble extractive value plays an important role in the evaluation of crude drugs and the nature of the constituents. Water soluble extractive value was found to be 16.88%. Less extractive value indicates adulteration or incorrect processing during drying or storage of the drug. Alcohol soluble extractive value was found to be 22.93%.

Preliminary Phytochemical Investigation of Stem Bark: Results of Qualitative analysis for the presence of various functional groups were carried out using six different solvent extracts are provided in Table No. 3.

Table no. 3: Phytochemical Investigation of *Albizia Lebbeck* plant extract in six solvents

S.N.	Tests	*Albizia Lebbeck* L. Benth. (AL)					
		AQ	ET	IPA	AE	CF	PE
1.	**Alkaloids Test**						
	Dragendorff's test	+	+	++	+	++	+
	Wagner's test	+	++	+	+	++	+
	Hager's test	+	+	+	+	++	++
	Iodine test	-	++	-	+	++	++
2.	**Flavonoids Test**						
	Shinoda test	+	++	-	-	-	-
	NaOH test	+	+	+	+	-	-
3.	**Tannins Test**						
	Ferric chloride test	++	++	+	+	-	-
	Lead acetate test	+	++	++	+	-	-

4.	**Phenols Test**						
	Ferric chloride test	+	+	-	+	-	-
	Ellagic acid test	++	++	-	+	-	-
5.	**Terpenoid Test**						
	Salkowski's test	+	+	+	+	++	+
6.	**Steroids Test**						
	Salkowski's test	-	+	+	+	+	++
7.	**Cardiac glycoside Test**						
	Keller-Kiliani test	-	+	+	-	+	-
8.	**Anthraquinone glycoside Test**						
	Borntrager test	-	+	-	-	-	-
9.	**Saponins Test**						
	Foam test	+	-	-	+	-	-
10.	**Carbohydrates Test**						
	Molisch's test	+	+	-	-	+	+
	Seliwanoff's test	+	+	-	+	+	+
11.	**Protein Test**						
	Biuret test	+	+	-	+	-	+
12.	**Amino acid Test**						
	Ninhydrin test	+	+	-	+	+	-

Key: + + Highly Present; + Present; - Absent; AQ-Aqueous; ET- Ethanol; IPA- Isopropyl alcohol; AE-Acetone; CF-Chloroform; PE-Petroleum ether

Investigation of twelve phytochemicals in the *Albizia Lebbeck* plant extract revealed that most of them were present in the ethanolic and aqueous extract as compared to the other fractions. The reason for the presence and absence of secondary metabolites is mainly due to the polar and non-polar nature of extracts and secondary metabolites. The order of polarity of the solvents from non-polar to polar is as follows: Petroleum ether < Chloroform < Acetone < Isopropyl alcohol < Ethanol < Water. *A. lebbeck* stem bark showed the presence of tannins, flavonoids, phenols, saponins, terpenoids, alkaloids, carbohydrates, protein, and amino acids in all fractions of aqueous and ethanolic extracts. Whereas, acetone, isopropyl alcohol, and chloroform also showed some traces but were absent in petroleum ether extract. Other findings showed that steroids and alkaloids have a marked presence in petroleum ether as compared to the other solvents. The presence of cardiac glycosides and anthraquinone glycosides was specifically observed in the ethanolic extract, indicating that these compounds are more soluble in ethanol compared to the other solvents used. (Table No.3.)

Phytochemicals are important for skin care cosmeceutical preparations due to their antioxidant, anti-inflammatory, and anti-

microbial properties. The above test results showed that all the twelve secondary metabolites (i.e., Phytochemicals) are present in good amounts in the *Albizia lebbeck* plant extract.

CONCLUSION: The present study presents a detailed evaluation of the physicochemical and phytochemical characteristics of *Albizia lebbeck* stem bark extract. This investigation contributes to the standardization process and helps verify its authenticity and safety for application in skin care cosmeceuticals. The findings support the extract's potential for use in therapeutic formulations aimed at improving skin health.

CONFLICT OF INTEREST: The authors declare that there are no conflicts of interest.

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WEB CONTROLLED SURVELLIANCE CAMERA CAR

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Abstract

In this paper we are discussing a surveillance Camera car using ESP 32 cam module that contains in-built Wi-Fi and Bluetooth to control the camera car that works in any smartphone using an IP address. Surveillance is a process of monitoring certain areas or locations and any person. Surveillance is generally used for security purposes. Since humans have their own limitations and cannot access specific places and cannot surveillance a place or a person for a longer period of time. We have built a surveillance camera car that is controlled using Wi-Fi and Bluetooth that can access any place and capture live photos and videos of a particular area or person. The control mechanism consists of a high definition camera that sends high quality picture or video to the server it's being operated with. We have designed the camera car using an L298N motor driver and programmed the ESP32 cam module using Arduino Uno and added some ion batteries so that the car can move in any direction. It is extensively used because of its simplicity and capability to modify or update to meet requirements. The surveillance car along with the other features can work during night using night vision. It can be controlled from a great distance as the range of the surveillance car is kept strong.

Keywords: Surveillance, Bluetooth, Wi -Fi, Arduino Uno, Esp32, IP address

INTRODUCTION

Web control and surveillance camera cars are vehicles equipped with cameras that can be remotely controlled and monitored via the internet. These cars are used for a variety of purposes, including security, monitoring, and surveillance. The web control feature of these cars allows the user to control the direction and angle of the cameras, as well as access live video feeds from anywhere with an internet connection. This feature is especially useful for security personnel, law enforcement, and other professionals who need to monitor specific locations remotely. Surveillance camera [9] cars can be used for a variety of applications, including monitoring traffic, crowds, public events, and remote locations. They can also be used for investigative purposes, such as gathering

evidence in criminal cases or monitoring suspicious activity. Overall, web control and surveillance camera cars provide a powerful tool for enhancing security and monitoring capabilities. As technology continues to advance, these vehicles are likely to become even more advanced and versatile, offering new opportunities for remote monitoring and control.

Some potential advantages of web control and surveillance camera cars include:

Increased Security: These vehicles can provide an added layer of security for various locations by allowing for remote monitoring and control of cameras. This can help deter criminal activity and provide real-time information to security personnel.

Remote Monitoring: The ability to access live video feeds from anywhere with an internet connection can be incredibly useful for remote monitoring of specific locations. This can be especially valuable for law enforcement, security personnel, and other professionals who need to monitor events or activities from a distance.

Evidence Gathering: Surveillance camera cars can be used to gather valuable evidence in criminal cases or other investigations. The ability to remotely control and monitor cameras

can provide valuable insights and information that may not be available through other means. Of course, there are also potential drawbacks to using web control and surveillance camera cars, including concerns around privacy and the potential for abuse. It's important to weigh the potential benefits against the potential risks before implementing these technologies in any setting.

Surveillance refers to the monitoring and observation of individuals, groups, or activities for the purpose of gathering information, maintaining security, or exerting control. This can take many forms, including physical surveillance [6], such as the use of cameras or other monitoring devices, and digital surveillance, such as tracking online activity or collecting data from personal devices.

Surveillance can be conducted by a variety of actors, including governments, law enforcement agencies, private companies, and individuals. It can be used for a range of purposes, such as preventing crime, identifying and responding to security threats, gathering intelligence, or monitoring employee performance.

However, surveillance can also raise concerns about privacy, civil liberties, and the potential for abuse, particularly if it is conducted without appropriate oversight or transparency. As a result, there is ongoing debate about the appropriate limits and regulations for surveillance activities.

Aims and Objective

1. The objective or the purpose of this project is to create a surveillance model that is an alternate of the surveillance security system and can standalone to locate and track any place or person and send live footage.[2]

2. The project is kept simple, affordable and ready to use.it consist of sensors that sends videos to the micro controller

3. The project is also kept user friendly with minimum installations and software requirements. It just uses and HTTP protocol to connect with the web server.[8]

4. The surveillance car can easily stand for seven hours with rechargeable batteries that can cover a larger area and can move in any direction from right and left direction to forward and backward directions.

5. The project eliminates constant human requirement making it easy for the society to work without the need of a person.

Block diagram

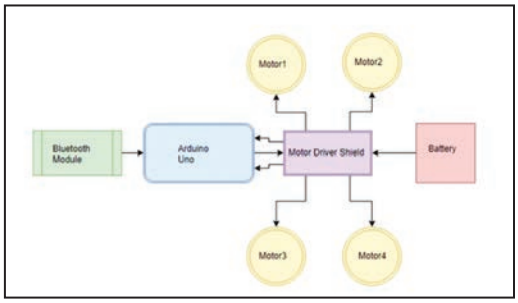

Figure 1

Hardware Requirement

1) L298N motor driver:L298N motor driver is an high power motor driver module for driving high dc .

2) Stepper motors: A brushless DC motor that rotates in steps is known as a stepper motor. This serves as an open-loop controller and is highly helpful because it may be placed exactly without any feedback sensors. The stepper motor comprises of a rotor, which is often a permanent magnet, and windings from the stator around it. The stator will become magnetized as we gradually activate the windings in a specific order and allow current to pass through them; this will create the electromagnetic poles that will propel the motor.

3) Arduino Uno: Arduino Uno is an open source based micro controller. It consist of sets of digital and analog input pins and output pins.

4) ESP32 cam module: Esp32 cam module is a small size low power consumption camera

module based on Esp32

5) Ion batteries and Jumper wires: Ion rechargeable batteries 5v each.

Procedure

STEP 1: Assemble the car

We used the components that is available in the market

STEP 2: Hardware installation

Solder the wires to the motor and connect esp32 with L298n motor driver with the help of jumper wires. Connect power supply as well

STEP 3: Uploading code to Esp32 cam module

Plug in the camera to the connector of the esp32 cam board. Programming of esp32 is done via CP2102 USB to TTL UART serial converter module. Connect the USB to TTL module with the Esp32 and short IOO pin to Esp32 to GND.

STEP 4: Upload the source code

Open the Arduino IDE select preferences and paste the link in the additional board URL manager. Put in the Wi-Fi credential and upload. Once the code is uploaded, disconnect the Esp32. Reset the board and look at the IP printed on the screen

STEP 5: Test the car

Once the IP is available, open any web browser on your smartphone and paste the IP address to get the controls of the car along with the camera.

Literature Review

1) King, Myron, Nirav Dave, and Arvind. "Automatic Generation of Hardware/software Interfaces." in ASPLOS '12: Proceedings of the seventeenth international conference on Architectural Support for Programming Languages and Operating Systems, ACM Press, 2012. P.325-336. Web. https://dspace.mit.edu/handle/1721.1/71201

The automatic generation of hardware software interfaces (HSI) involves using tools and techniques to create a standardized interface between hardware and software components.[1] The aim is to reduce the complexity of designing and implementing interfaces, increase productivity, and improve overall system performance.

2) Hardware Support for Active Networking Alexandros G. Fragkiadakis, Nikolaos G. Bartzoudis, David. J. Parish, Mark Sandford Department of Electronics and Electrical EngineeringLoughboroughUniversityUK Proceedings of the International Conference on Security and Management, SAM '03, June 23 - 26, 2003, Las Vegas, Nevada, USA, Volume. https://www.researchgate.net/publication/221199834_Hardware_Support_for_Active_Networking

Active networks are a type of computer network architecture where network nodes are programmable and can execute user-defined programs or scripts. The concept of active networks has been around for several decades, and many research projects have been carried out in this area. However, active networks[2] have not yet become widespread in commercial networks.

3) Comparing Embodied Greenhouse Gas Emissions of Modern Computing and Electronics Products Paul Teehan*,† and Milind Kandlikar‡ † Institute for Resources, Environment, and Sustainability, University of British Columbia, 2202 Main Mall, Vancouver, British Columbia, V6T 1Z4, Canada Environ Sci Technology2013 May 7;47(9):3997-4003. doi: 10.1021/es303012r. Epub 2013 Apr The embodied greenhouse gas (GHG) emissions of modern computing and electronics products refer to the amount of GHG emissions that are released throughout the product's life cycle, including the production, transportation, use, and disposal phases[4]. These emissions are often associated with the energy used in the production of materials, the manufacturing process, and the transportation of components and finished products.

Result

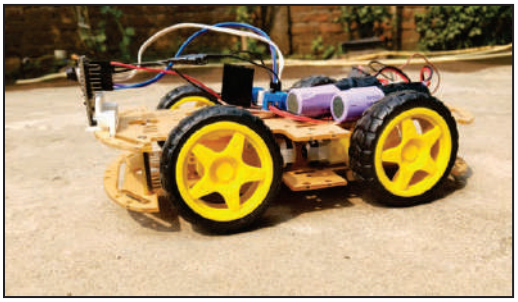

Figure 2

Figure 2 shows the assembled model of the surveillance car that consists of a L298n motor driver connected with the esp32 cam module along with the power supply . the car is controlled with the help of the smartphone and sends live footage and videos.

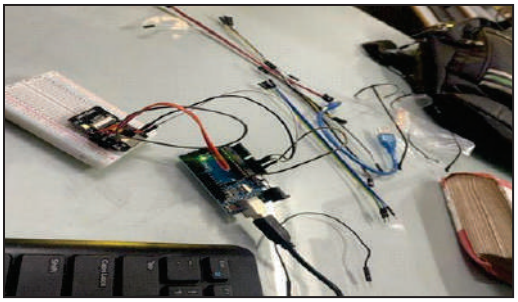

Figure 2

Figure 3 shows the implementations of code using Arduino uno with the help of the Arduino IDE .The Arduino is connected to the esp32 cam module with the help of the jumper wires and breadboard. We have connected the Arduino with the help of the USB port cable that transfers the code.

Figure 4 shows the live video captured by the esp32 cam module over a web browser using HTTP protocol. The page consists of four controllers up, down, left and right. It also has controls to change the speed of the surveillance car along with the flashlight which can also increase and decrease its intensity accordingly. That means that the car can easily travel in any dark location or places.

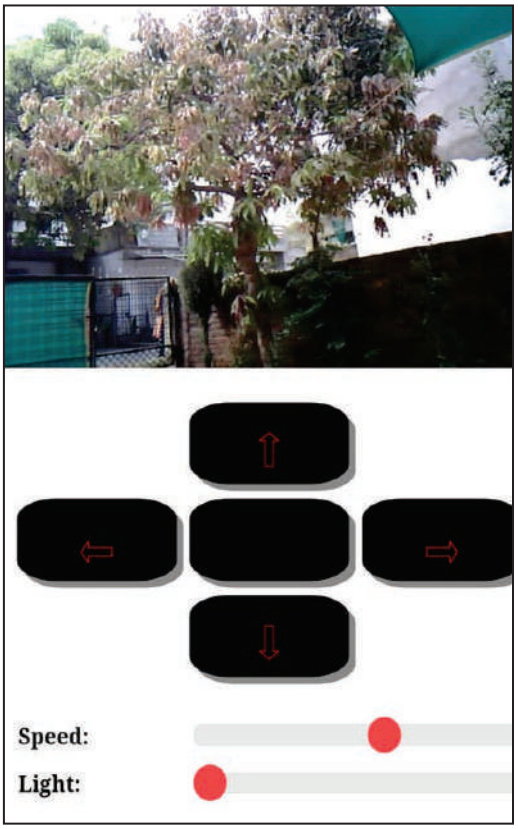

Figure 4

Conclusion

The surveillance car is aimed to provide streamlined user experience to each one of them.this project covers the aspect of human need for surveillance. It provides efficient and easy motion of the car that can cover large areas in a small amount of time. The project can easily be customized according to one's needs. Hence it can be used anywhere from house to offices and schools. The project is built inexpensively and made sure that it can be easily accessible by any user. Which makes it user friendly.

Future Scope

The future scope of the project is very vast in this type of technology ;

1) This project can be further customized and updated according to one's requirement

2) Adding alarm to the surveillance car can alert if there's any danger to a person or a robbery nearby

3) This project can also be used in the house to keep watch on the children in case of there safety,

4) This project can also be used in the bank, warehouse, airport, railways etc.

5) Surveillance is becoming a basic need in the private areas as well as public areas to cope up with threats, robbery etc.

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The Role and Implications of Contextual Factors on Outcomes of Transferred Interventions in Urban Mobility

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Abstract

Transfer or transplant is an age old phenomenon especially in policy making domains of various fields.In transport planning its manifestation is evident in both 'soft' and 'hard 'solutions when it comes to tackling complex mobility challenges. However, examples across the world point to unique and varied responses once the transferred measures are in place and operational. They seem to be marginally or partially successful in the recipient cities or nations. This study seeks to understand the rationale for transfers and to find the causative factors of transferred interventions. The study contends that despite assessment and evaluations being done before intervention provision their outcomes in recipient cities remain debatable even in economies of their origins. The paper attempts to analyse cases to examine the manifestation and rationale of transferability of measures in urban transport planning across geographic boundaries and the ramifications of adopting transferred interventions by investigating the removal of grade separated links. The study elicits the significance of contextual factors at the decision-making phases which are critical to their redundancy, usefulness, acceptance, and success.

Key words: urban mobility, transferability, outcome, grade separator, comprehensive, factors

1. Introduction :

The built environment is a complex conglomerate changing with time and space and emerges as a dynamic spatial organization with mobility at its core to be functional and accessibility is its direct measure of success of a highly desirable livable area [1]. The city's ability to serve its purpose and become livable depends on its transportation networks, their form, degree of connectivity and characteristics. [2]

Since transport infrastructure is largely visible, makes an impact on the public mind because of its massiveness and large footprint; State and city policy makers push for them to be built and commission them [3]. They usually become landmarks and impart identity to a city without much thought being given to their relevance, consequences or impacts [4][5].

Differing socio-political characteristics, needs, and interests over a spatial- temporal dimension generate mobility in which people alter or change their mobility requirements as per need. Automobiles have taken precedence on the roads competing with other modes. On urban roads a person switches roles between being a pedestrian, motorist or a bicyclist as required [6]

In such a scenario growing urban population presents challenges to city administrators and planners to tackle issues like congestion, accessibility, and safety in a dynamic urban environment. Decision makers have had to reform policies and planning strategies at the local, state or national level, especially in the past three and half decades in developing countries

Hence tackling mobility challenges are recent for many developing economies when compared to developed economies who are more experienced and adept at doing so. However, knowledge gaps, capacity dearth and limited exposure and the urge to bridge the gap between their technologically advanced and progressive contemporaries has prompted developing to seek solutions and strategies from the developed world.

Theoretically, this tendency can be attributed to the fact that whenever tackling situations and issues not faced previously becomes challenging

and for which precedents do not exist locally, they are searched and emulated from other places mostly to save time and effort. [7-9].

Thus, the cities from developed economies have become icons and their strategies and successes have become the benchmarks which are being emulated to find solutions to what is perceived as similar challenges. This has triggered transplants or transfers in planning approaches, design solutions, policy making, technology and knowledge for achieving better mobility outcomes and consequently economic advancement/growth

The phenomenon of transfer in policy making and intervention provision has been explored in numerous studies in the field of education, medicine, health care, social welfare, tourism, and economics but has largely remained unexplored in the field of urban transport [10] [11].

The paper investigates two issues: i) the manifestation and rationale of transferability of measures in urban transport planning across geographic boundaries. ii)The ramifications of adopting transferred interventions thereby eliciting factors which tend to influence their outcomes.

The study is thus an attempt to focus on the critical but largely ignored aspect of contextualizing an intervention to make it relevant and effective in delivering beneficial outcomes whenever and wherever they are adopted.

The study is a part of an extensive literature review undertaken to examine intervention provision and assessment of how, why and which factors caused the removal of the interventions although being provided for mitigating mobility issues

By addressing this critical aspect, the paper attempts to address the hypothesis that a transferred interventions suitability and compatibility depends on its context to be relevant and hence if disregarded during planning and decision making could lead to partial or complete failure. The study aims to elicit predominant factors by analyzing cases of removal.

Methodology and approach:

The premise of the study is that transferred solutions are not necessarily as successful in their places of origin much less in their places of adoptions and need to be thoroughly analyzed before being implemented or provided which may result in compounding issues rather than ameliorating them

The study is presented under the following three heads:

i) The concept of transfer with respect to the urban transport planning domain ii) analytical study of cases at the place of origin and rationale for removal, iii) observation on impact in transferred locations, discussion and conclusion. The study is cross sectional in nature and cases are compared based on their common outcome of removal from their operational locations. Secondary sources have been referred to underline common aspects leading to their removal and outcomes. Nine cases of grade separators of which seven are from the United States of America (the country of origin) and one each from France and Korea have been selected for case studies. The criteria used for analysis are: Need for provision, Operational life, Design attributes, Outcome after commissioning, Issues and problems after becoming operational, Rationales for retention and removal, Outcome after Removal ,Proponents For Removal ,Trigger and Contextual factors of removal.

The discussion section elaborates on the adaptation and adoption of the grade separator by Economies which have diverse and therefore complex traffic characteristics, urban environments, and other contextual aspects. Lastly, the conclusion expounds on the possible implications and future possibilities for exploring this phenomenon.

3. Literature review

3.1. Transfer and its manifestation: Transfer can take place across time, within as well as across countries. Additionally, there are different degrees of transfer: this can involve straight-forward copying of policy, legislation or techniques as well as various forms of emulation, synthesis, hybridization, and inspiration. Transfers can be voluntary or coercive or combinations thereof. There is a vast distinction about transfers being successful, inappropriate, uninformed or incomplete transfer or wrongly adapted one.

Generally, policies seem to be the most transferred measures and thus policy transfer is understood as a process by which "knowledge about how policies, administrative arrangements, institutions and ideas in one political setting (past or present) is used in the development of policies, administrative arrangements, institutions and ideas in another political setting" Policy transfer can involve several processes. The objects of transfer can include (i) policies, (ii) institutions, (iii) ideologies or justifications, (iv) attitudes and ideas, and (v) negative lessons

Evidence suggests unique and varied outcomes once transferred measure is in place either having marginal or partial outcomes. It is pertinent therefore to examine cases to understand why and to ascertain the determinants or factors which influence such outcomes. However, transfer literature rarely has acknowledged that policy and intervention failure is more common a reality than accepted. Also, there are abundant studies which exemplify how policies and measures are transferable but very few studies which highlight the shortcomings or limitations of infrastructure interventions as a mitigation measure and focused on outcomes of the policy in question or the measure [12].

3.2. Transferabilityin the urban transportation domain: A historical Perspective

The fast-paced progress witnessed globally post the industrial revolution era mostly manifested in western and north- western parts which triggered urbanization and economic progress. And as a result, the provision of infrastructure to distribute the benefits of growth and progress symbolized by auto mobility was imminent [13][14]. Economic progress obviously indicated development manifested through technological advance, research in scientific fields and culminated in progressive infrastructure provision in most of these countries. This phenomenon was cyclic and further reinforced the belief that for a nations progress emphasis should be on infrastructure investment and development was essential more so for its liveability. (13). And this notion is the genesis of transplant of ideas, technology, policies and planning from developed economies to developing economies [18].

The concept of sustainability originated and later globalised through its report "Our Common Future "during the UN World Commission on Environment and development held in1980 and hereinafter transplants in knowledge and technology were faster and less sporadic in nature.

So it is to the globalization that the percolation of transplants in mobility related issues to urban centres is owed. The trigger for this was also the fast-paced progress of many urban centres of developing economies facing challenges to streamline their transport network and meet growing demand. These were situations which the developing economies perceived as surmountable by the developed economies very successfully and beneficially a few decades earlier. Developing economies also believed that their capacity to compete would be greatly enhanced by improving their urban mobility with measures replicating those from the developed economies. Better networks were fast routes and heralded as growth inducers indicating progress and development which

developed nations had achieved thus exemplifying why economics and engineering disciplines have been used to frame urban policies and interventions in transport planning [15].

In the decades spanning 1970-1990 multi-level collaborations were formed across the EU to encourage balanced growth for sustainability. Initiatives and programmes were drawn up for funding, providing technical expertise in the form of consultancies as well as for development and research focused primarily on urban areas. Several initiatives and programmes were launched by World Bank, UN and other international banks like the ADB for development of the underdeveloped and the developing world. Technology and knowledge sharing through research, partnerships, and collaborations between developed and developing economies gave further impetus to the phenomenon of transplants.

In the domain of urban transport planning transplants occurred as an outcome of adopting investigative methods for diagnostic purpose, funding, and planning models, methods of appraisal, provision, design, and implementation of Infrastructures required to meet current and future demand. Therefore, outsourcing and capacity building collaborations, consultancies solicited from the international domain and Special Purpose vehicles which came into existence for building state of the art Infrastructure also increased transfers. Thus, in the urban transport planning domain transfers have occurred by direct emulation, by drawing parallels within situations or by discreet emulation or sometimes manifested as a combination of the three [4]

These were well-intentioned endeavours of importing best practices and projects implemented elsewhere by organisations and governments. However, most had marginal success when compared to the places of origins of solutions, practices or policies. These are the failures which academic literature has just started hinting at but not dealt in great detail although this is a potential knowledge reserve which can guide future policy trajectories (4)(9).

In the realm of transport planning failure of a measure or partial success could be attributed to several reasons one of which was impacts of transfers were not properly estimated or envisaged as decisions were based mostly on CBA analysis for projects since benefits could easily be quantified and proved to outweigh dis benefits. Conflicts in stakeholder interests, unforeseen problems, issues, and obstructions were ignored as less important in the face of so-called development. The most significant was the fact that fundamental differences in an economic, socio-demographic and cultural context were also disregarded. Methodological and Technological Issues in Technology Transfer, as well as Legal context of the economies in which they were to be implemented, were largely discounted. Also, financial capability and capacity shortfall were also ignored [16].

3.3: Tenets Of Transfers: The literature on transfer in urban transport mostly is a diffusion of successful examples validating findings, establishing benefits, positive outcomes while recommending their potential applications [11]. Measures, therefore, become exemplars or models for resilient cities to emulate; examples being Greater London's congestion charges, America's freeways, Curitiba's BRTS, Bogota's CICLOVIA, Singapore's MRTS and Japan's Rapid Transit System to name a few. These are icons embodying the concept of success have become precedents studied by policy and decision makers for their formula to success.

In seeking solutions, the first tenet of transfer that evidence is the best base for policy movement is followed especially in transport planning. The justification is what works best in one situation should work in others leading to the diffusion of solutions, policies, and ideologies to other cities. The second tenet is diffusion. Most of this diffusion has at its root, the economistic and

rationalistic ideas for wider acceptance. The state of the practice of going by being a widespread practice is a global phenomenon and thus rarely qualifies for any analytical study due to its obvious acceptability or universality.

And lastly, an enabling environment for e.g. globalization of established theories and knowledge sharing platforms or forums creates an environment of learning of complex issues triggering transfers which manifest in the transport planning domain. But despite these tenets of transfers in the transport domain barring a few exceptions, many issues remain partially or fully unresolved. Reasons could be many and varied.

As Stead, De Jong and Reinhold (2005) pose a query in "Sustainable urban transport policy transfer in Central and Eastern Europe "about the adaptability of the measure to the city context or vice versa The question is should a city adapt to urban transport measures or should the transport measure be adapted to suit the city context? This is the most crucial question for a transfer to be successful and which hinges on important factors which need to be investigated.

4.Analysing the Grade Separator Genesis and Removal:

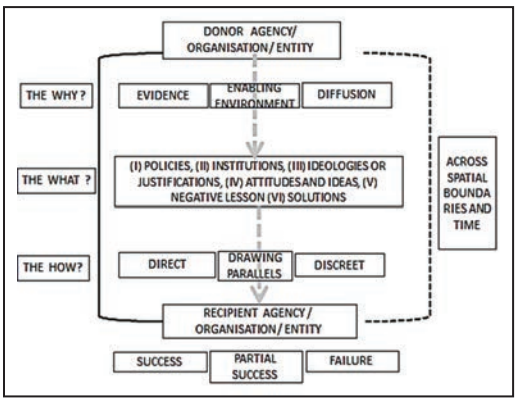


FIGURE 1: Transfer Process

By definition, a grade separator is a method or measure to cross one or more junctions or crossroads of two or more surface transport axes at different heights (grades) so that they will not disrupt traffic flow on other transit routes.

Grade separators could be bridges (or overpasses or flyovers), tunnels (or underpasses), or a

FIGURE 2: Park East, Milwaukee (before removal)
(source: www.preservenet.com)

combination of both. In North America, a grade-separated junction may be referred to as a grade separation or as an interchange (6).As a method to cross one or more junctions or cross roads of two or more surface transport axes at different heights (grades) so that they will not disrupt the traffic flow on other transit routes when they cross each other is what is termed as a grade separator in the US and UK. These were popularised in the 1930s-1950s in the United States of America when the interstate system was developed and built to connect not only the rural areas but also urban areas. These structures came to be looked upon as symbols of growth and the domination of the car which was a dream for the rest of the world. In the United States of America, the need for building and using the urban freeway was justified basically to accommodate the growing automobile population which symbolized personal freedom and flexibility, promote faster mobility, revitalize downtowns, allow economic growth, promote defence, provide regional connectivity and most importantly reduce congestion.

Impressed by the European Autobahns which were built in the 1930s for speed and connectivity, the American answer was the Interstate highways connecting all cities and towns and faster mobility meant access control. For faster mobility through the city and across the cities the planners, engineers and other stakeholders evolved, designed and promoted the access-controlled measures or mechanisms called the grade separators famously called the freeways in the United States of America and flyovers in the developing world. Awareness of the adverse impacts of the flyovers was felt by the 1960s through to 1970s by community activists, planners, and stakeholders who revolted against the building and sanctioning of the freeway slicing and crisscrossing urban areas. The anti-freeway movement gained momentum for their removal at local levels in several cities but was actualized only in some of them.

The analysis presented is of seven grade separators from the United States of America and one each from France and Korea. These are investigated for eliciting factors and the changes which occurred due to their existence or non-existence. Analysing the causes and the proponents of the removal of the freeways several of them emerge [18]. The cases have been comprehensively analysed to elicit reasons for their existence, the triggers or catalysts for their removal, the arguments against and for their removal, the changes which occurred due to their existence and changes which occurred after their removal. The cases of removal, therefore, give an insight into the contextual factors which resulted in their demolitions and therefore are a clear indicator of transferred measures being unsuitable and irrelevant to the location and context. For all case studies, it was found that justification for their existence was based on forecasted demand of traffic volumes which the links would carry in future. None of the other aspects or impacts of sustainability, environmental assessment, and community benefits were studied, examined, justified or substantiated in the proposals in depth. These were only surmised and assumed to be in favour of the building of the grade separator as a necessity.

The Park east freeway, Milwaukee and the Harbour Drive Freeway, Portland, Oregon, the emerging contextual factors were the locational attributes of the Juneau Park, the lake and the river which would divide, detract, dissociate and devalue their significance as recreational and relaxing spaces for the citizens. Also, the environmental impacts of constructing a substantial part beside or through them to accommodate the built form as well as the high-speed movements of vehicles proved to be detrimental to the local ecosystems. (Figures 2 and 3) The emergent factors which were the main triggers for demolishing are found to be the spatial dispersion or spread of the city over a wider area which meant a space crunch for citizen's housing needs near city core thereby increasing commutes to suburban areas. It also indicated financial resource shortfall of the local body to reconstruct and maintain the freeways after damages were incurred.

The factors for the irrelevancy of the freeway which signalled a rethink on New York's West Side Highway was the higher pollution levels found and the awareness about the detrimental effects on human health due to Auto mobility.

FIGURE 3: Harbour Drive After Removal
(source: www.preservenet.com)

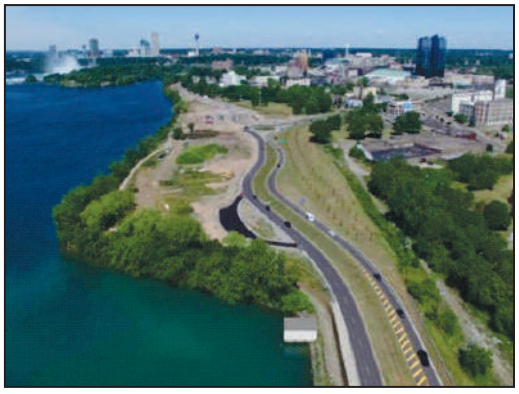
The emergent factors for the Robert Moses parkway, Niagara Falls, NY state was the loss of habitat and loss of human population due to migration. It was also found that there was a lack of opportunity to earn livelihoods as the link segregated the area due to the fast-moving traffic and consequently fewer people made any stopovers. This provided lesser opportunities for businesses to thrive which otherwise could have flourished like the Canadian side of the Niagara Falls (Figure 4 and 5)

The grade separator of the inner ring freeway in Rochester has filled up due to the moat like effect of the circular freeway and its underutilization. Neighbourhood Isolation was a major concern for its filling up. The benefits which were immediately felt by the residents of these nine cities were evolution of engaging and human centric walkable spaces, opening up of land for development giving impetus to healthy lifestyles and recreational facilities for the community , Increase in housing stock, Improving views and vistas , fostering cohesiveness amongst the communities, removal of blighted segments areas, positive environmental impacts as flora and fauna could be restored, providing sustainable solutions as maintenance and upkeep of the Grade separators was not possible for Urban Land B's from the revenues at their disposal. The case studies examined also showed that despite their existence for more than 30 years their removal did not cause congestion or any traffic related issues as per objections to prevent their removal [9].

Thus, the case studies clearly indicate that post removal benefits far outweighed the benefits which pre-existed before their removal. The contextual factors derived from the case studies, and which should have been considered for the suitability and relevance of the grade separators are grouped into five categories: environmental aspects, socio-cultural aspects, economical aspects, physical aspects, organisational aspects. Although the grade separators serving an area and its citizens ranged between 10- 57 years their removal did not cause any problems or issues as was initially envisaged and especially congestion due to volume overload. This is very important as Grade separators are thought to be a panacea for traffic congestion and are popular as transferred measures in most of the developing economies especially India and China.

The cases studied are testimonies transferred measures inhibiting growth and quality of life when contextual considerations are ignored. They were removed to finally realize the benefits of their non-existence in each case. The determinant factor score matrix shows social factors were the most influential in the removal of the grade separators (Table 1)

(Before)



(After)

FIGURE 4 AND 5: Robert Moses Parkway, Niagara Falls, NY
(Source: www.preservenet.com)

FACTORS	AGENDA	DRIVERS FOR REMOVAL									BENEFITS									SCORE
	GAVE PRECEDENCE TO	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	
SOCIAL :	GENERATE EMPLOYMENT AND RETAIN PEOPLE , STOP OUTMIGRATION					YES	YES	YES		YES		YES		YES	YES	YES	YES		YES	10
	INCREASING SAFETY, SECURITY AND REMOVAL OF BLIGHTED ZONES OR UNSAFE ZONES					YES		YES		YES		YES		YES	YES		YES		YES	8
	REVITALIZATION ; RECREATIONAL AND HEALTH ACTIVITIES , CREATE LIVELINESS AND ATTRACTIVE TO PEOPLE	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	17
	FOSTER COMMUNITY LIFE BY INCREASED ACTIVITIES AND COHESIVITY. REMOVE SEVERANCE		YES		YES	YES	YES	YES	YES	YES				YES		YES	YES	YES	YES	12
	HEALTH AND WELL BEING							YES	YES	YES			YES	YES	YES		YES	YES	YES	9
ENVIRONMENTAL :	CONSERVE NATURAL RESOURCES	YES					YES			YES	YES					YES			YES	6
	REGAIN LOST HABITAT AND SPECIES, BIODIVERSITY , ECOSYSTEM	YES					YES			YES				YES		YES			YES	6
	PEACEFUL , SERENE AND TRANQUIL SURROUNDING		YES				YES		YES							YES		YES		5
	HEALTH ,RESTRICT TRAFFIC AND DECREASE AIR POLLUTION	YES		YES			YES	YES	YES	YES				YES		YES	YES	YES	YES	10
ORGANISATIONAL :	INVEST IN OTHER PROJECTS WHICH ARE MORE FINANCIALLY VIABLE		YES		YES	YES		YES		YES					YES	YES	YES		YES	11
	FAVOUR MINIMAL MAINTENANCE ENTITIES		YES			YES		YES						YES	YES		YES			6
	FAVOUR OTHER MORE SUSTAINABLE SOLUTIONS , FACILITY .		YES		YES	YES		YES						YES	YES	YES	YES			7
ECONOMIC :	REGAIN LAND FOR HOUSING AND BUSINESSES				YES	YES		YES		YES	YES	YES		YES	YES		YES		YES	10
	RE ESTABLISH LANDUSE OTHER THAN FOR TRAFFIC ROUTE AND REGAIN LAND UNDERUSED IN PARKING AND MOBILITY				YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	14
PHYSICAL :	REGAIN VIEWS AND RETAIN AESTHETIC APPEAL OF LANDSCAPE		YES				YES		YES	YES	YES	YES				YES		YES	YES	9
	ACCESSIBILITY AND CONNECTIVITY			YES	YES		YES	YES	YES	YES	YES			YES		YES	YES	YES	YES	12

Table 1 : Determinant Factor Score (Case 1 : Embarcadero; Case 2 : Central Freeway; Case 3 : WestSide Freeway; Case 4 : Park East Freeway; Case 5 : Westway; Case 6: Robert Moses Freeway; Case 7 : Rochester Freeway; Case 8: Pompidou Paris; Case 9: CheongyeChen , South Korea)

5. Discussion on context of grade separator as transfers in Indian context from places of origin:

Each city environment the world over is a unique combination of a socio-economic-cultural mix of its population indulging in various activities within a physical setting which is also unique. A few cities may share similarities in some parameters. But this uniqueness of cities defines and translates to a unique response to a stimulus or an occurrence as the examples studied have shown. Therefore, although their urban settings were outwardly similar their unique needs decided their outcomes each differed in the response to the intervention viz. the grade separator.

The preoccupation for building flyovers or grade separators in the cities of developing countries, especially Indian and Chinese cities as a measure to mitigate congestion and related issues has its genesis on the obsessive focus on the way cities of the industrialized nations especially the United States of America were economically progressive based on faster connectivity and auto mobility dependence. There is a fascination for private vehicles as faster modes and a policy environment fostering the rapid growth in ownership of private modes like two and four wheelers in India currently. Indian cities exhibit transfers in the form of emulation of measures. The building of flyovers in Indian cities is a case of transfer of solution as the notion of the seemingly fast pace of growth and modernity

that the cities of industrialized nations possess encapsulate the ambitious goals of the stakeholders and citizens to compete and equalize with them. (Figure 6 and 7).

FIGURE 6: Kemps Corner Flyover, Mumbai

FIGURE 7: A grade separator Under Construction

However, consideration for the contextual factors which comprise of site-specific issues could influence the performance and outcome are not given due importance. These are the demographic, social, cultural or functional characteristics of the Indian cities.

For example, in Indian cities, the first major contextual factor would be the variety of mixed modes plying on the streets and its variable traffic behavior. The flyover as a measure would cater only to the needs of fast modes disregarding the majority who walk, bike and use slow modes for daily subsistence or commute. (Figure 8 a and b). Most Flyovers are long distance links and commuters of slow modes are not their chief users rendering junctions as chaotic zones delaying the faster moving vehicles and thus negating its benefits. A second major factor is design since the existing street patterns are organic and of conflicting widths where broadening or levelling poses challenges. The third factor is the Indian society has culturally entrenched values which not only make the road commuter a customer of the informal businesses which are conducted on the roadsides but also one who prefers to relate to the environment of the street which a flyover does not offer to him. But in the seventies decade to emulate the American urban freeways symbolizing progress and economic supremacy Chennai became the first city to build its first flyover. The Anna flyover set a precedent, and other metros followed suit. During the commonwealth games held in New Delhi 2010. 24 flyovers were built. However, the average speeds did not improve and ranged between 10- 24 km/hr. [20, 21]. The case of Bangalore and Hyderabad, India, two of the fastest growing cities have mobility issues and problems despite grade separated arterials. [22, 23].

The city of Mumbai boasts of the longest flyover in the country which was completed in 2014 as also the Worli Sea Link completed in 2009.Other cities vie for such capital-intensive projects to be sanctioned in competition as well as comparison with their benchmarked developed or progressive counterparts within the nation and across the globe. Hence there are a few tier three and even tier four towns and cities which boast of grade separators and flyovers being constructed and regardless of whether they were aiding or harming the socio-economic culture. Although flyovers are being pulled down or recommended for demolitions in the country of their origin, Indian Cities are proposing and building flyovers regardless of whether they aid or harm the socio-economic culture and other contextual aspects. Currently, the Indian metropolises are burgeoning with flyover projects with tier two and tier three cities too.

(a) (b)

FIGURE 8 (a-b) : Indian Road conditions and traffic stream mix in tier II and Tier III cities.

building them as mitigation measures and avoiding congestion. Contrary to expectations traffic chaos and congestion remains today more challenging than it was before flyovers were built. Building and recommending flyovers as a panacea for Indian traffic conditions is a form of transfer which is the outcome of fear of being left behind in the global race for economic supremacy, it is also the case of idolized and a mistakenly benchmarked model transfer.

6. Conclusion:

Cities today face varying demands on its network and therefore are posed with many challenges which planners and policy makers prioritize to provide interventions in urban transport to deal with them. However, complexities in planning and designing transport networks in urban areas need better insights to achieve the best planning Goals (1). This study has indicated that even in developed economies cases of transferred solutions have not yielded the same results witnessed in the places of their original application. Therefore, any measure necessitates analysis at the planning and decision-making stages for its suitability and compatibility within the context in which it will be implemented.

This paper attempted to address the following through an illustrative case study method: firstly, the manifestation and rationale of transferability of measures in urban transport planning across geographic boundaries. Secondly, it examined the ramifications of adopting transferred interventions thereby eliciting factors which influence their outcomes**.** These factors are different and unique to every city and for the same intervention, the outcome varied. Thirdly it is clear from the cases presented that a transferred measure will not have the same degree of success as it had in its place of origin. This indicates the need to consider the nature and character differences of a recipient city and a donor city for a transfer which should be thoroughly understood.

The study finds that transfers are inevitably a recourse while tackling complex situations, but it also emphasizes the value of formulating an ex-ante evaluation methodology based on contextual factors and indicators complementing conventional data. A combination of qualitative and quantitative aspects in the methodological framework could help identify location specific issues and anticipate possible outcomes. Thus, aiding and minimizing issues which unnecessarily get compounded due to non-consideration of important factors before an intervention is adopted or adapted in each context.

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Stress of Parents of Intellectually Disabled Children An Exploratory Study

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Abstract

Intellectual disability is one of the most prevalent developmental disabilities of the children universally. Family is the main source of support for these children in any society. Parents experience huge physical and mental stress to tackle the intellectually disabled children. This present study tried to explore the stress of parents of intellectually disabled children. It included 100 parents, 50 of whom had girls with intellectual disability and another 50 parents of boys with intellectual disability. Personal Stress Source Inventory developed by Arun Singh, Ashish K. Singh and Aparna Singh and a general information questionnaire was used. The data was analyzed using descriptive (Frequency, percentage, Mean, SD) and inferential statistics (One Way ANOVA & CR test). Results obtained revealed that the parents of intellectually disabled girls have more stress than parents of intellectually disabled boys and all parents experienced similar levels of stress, irrespective of their child's ordinal position.

Keywords: Intellectual Disability, Parents of intellectually disable children, stress.

Introduction

Intellectual Disability

Intellectual disability is, above all, a label; it is a term used to identify an observed performance deficit – failure to demonstrate age-appropriate intellectual and social behavior. Numerous definitions of Intellectual disability have been proposed, debated, revised and counter proposed over the years, the debate over definition continues today.

In early times, people with severe cognitive deficits were labeled *idiots* (derived from a Greek word meaning "people who did not hold public office"). In the 19th century, the label *imbecile* (derived from the Latin word for "weak and feeble") indicated a less severe degree of intellectual disability. Over the years, mental deficiency [1-2] and, later, mental retardation [3-4] were introduced and considered appropriate terminology. In 2007, the American association on Mental Retardation changed its name to the American Association on Intellectual and Developmental Disabilities (AAIDD).

Since mental retardation is a concept that affects and is affected by people in many different disciplines, it has been defined from many different perspectives.

The two definitions most widely used during the first half of this century were written by Tredgold and Doll.

Tredgold (1937) A state of incomplete mental development of such a kind and degree that the individual is incapable of adapting himself to the normal environment of his fellows in such a way to maintain existence independently of supervision, control or external support [5].

In 1941 Doll suggested six criteria essential to the definition and concept of mental retardation:

These are 1) social incompetence, 2) due to mental sub normality, 3) which has been developmentally arrested, 4) which obtains at maturity, 5) is of constitutional origin, and 6) is essentially incurable [6].

The Individuals with Disabilities Education Act (IDEA) defines intellectual disability as "significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a

child's educational performance" [2].

The definition specifies three criteria for a diagnosis of intellectual disability. First, "significantly subaverage intellectual functioning" must be demonstrated. Second, an individual must also have significant difficulty with tasks of everyday living (adaptive behavior). Third, the deficits in intellectual functioning and adaptive behavior must occur during the developmental period to help distinguish intellectual disability from other disabilities (e.g. Impaired intellectual performance caused by traumatic brain injury).

Types of Intellectual disability

Through the last half of the 20th century, Intellectual disability and people so diagnosed were classified by their degree of intellectual impairment – mild, moderate, severe, and profound – each level encompassing a range of IQ scores.

Traditional Classification of Intellectual Disabilities by IQ Score

Level	Observation
Mild	50-55 to 70
Moderate	35-40 to 50-55
Severe	20-25 to 35-40
Profound	Below 20-25

Today clinicians and researchers apply the same four descriptors to designate levels of intellectual disability but base their classification on a person's adaptive behavior rather than IQ score. The shift recognizes the central role of adaptive behavior in determining the types and levels of supports a person needs, the inexactness of intelligence testing, and the importance of clinical judgment in diagnosis and classification (American Psychiatric Association, 2013; Schalock & Luckasson, 2014).

Causes of Intellectual disability

Before conception, if the age of the mother is below 20 years, then there is a risk for abortions, premature deliveries, low birth weight, chromosomal abnormalities and if the age of the mother is above 30 then problems such as delayed deliveries, chromosomal or physical abnormalities are seen. Malnutrition and ill-health of the mother, substance abuse of smoking alcohol use affect the health status and adversely affect the developing fetus.

Prenatal cause includes poor antenatal checkup, abortions (repeated, attempted, threatened), poor nutrition, diabetes, Rh-incompatibility, hypertension, convulsion, infection (rubella, herpes), STD, physical trauma or injury, use of drugs, emotional trauma, potentially harmful medication, multiple pregnancies, maternal mental illness and excessive bleeding during pregnancy.

Perinatal cause includes hypoxia or anoxia which affect the fetus during the period of delivery, premature separation of placenta, difficult and prolonged labor, abnormal presentation, cord around the neck, unhygienic delivery, convulsions during delivery.

Postnatal cause includes delayed birth cry, low birth weight, infection, trauma, jaundice, malnutrition.

What is stress?

Stress is like electricity. It gives energy, increases human arousal and affects performance.

The term stress refers to negative emotional experiences with associated behavioral, biochemical and physiological changes that are related to perceived acute or chronic challenges. Stressors are the events that stimulate these changes.

Richard S. Lazarus defined, "Stress is a condition or a feeling that is experienced when a person perceives that demands exceed the personal and social resource the individual is able to mobilize."

Baron defined, "Our response to events that disrupts or threaten to disrupt our physical or psychological functioning.

Stress is body's way of responding to any kind of demand. It can be caused by both good and bad experiences. Stress can affect our body as well as mind. Everyone experiences stress at times-adults, teens and even kids. The human body responds to stressors by activating the nervous system and specific hormones like adrenaline and cortisol. These hormones speed up the heart rate, breathing rate, blood pressure and metabolism to cope up with stress. Repeated stressful situations affects all body systems contributing to physical and psychological problems.

Types of stress

- Acute stress (short term)- an acute stress occurs in response to a traumatic stress or, and is marked by fear, horror, or helplessness together with symptoms of dissociation such as numbness, feelings of detachment, diminished awareness of surroundings, depersonalization, and often amnesia.

- Chronic stress (long term)- Frequently modern life poses ongoing stressful situations that are short lived. The urge to act (to fight or flee) must therefore be controlled, stress then becomes chronic.

- Eustress (Good stress) – This positive stress contains feeling of physical or psychological arousal and a sense of preparedness to receive the forthcoming adversity or difficulty. It makes the individual ready and motivates the individual to face the situation.

- Distress (Bad stress) – This kind of stress contains feelings of physical or psychological over arousal which causes a sense of oppression creating troubles in the body and the mind. This kind of stress is capable of affecting physical health.

Factors contributing to stress

- Conflict: - Stress comes from conflict. It occurs when the attainment of a goal is threatened by an environmental obstacle outside the person or by a physical or psychological obstacle from within him.

- Life Events: - Changes, both big and small sudden and gradual affect one's life from the moment individual is born. One learns to cope with small, everyday changes but major life events can be stressful, because they disturb one's routine and cause upheaval.

- Hassles: - These are the personal stresses one endures as individuals, due to the happening in daily life, such as noisy surroundings, commuting quarrelsome neighbor's, electricity and water storage, traffic snarls, and so on. There are some jobs in which daily hassles are very frequent.

- Traumatic Events: - These include being involved in a variety of extreme events such as fire, train, road accidents, robbery, earthquake, tsunami, etc. The effects of these events may occur after some lapse of time and may sometime persist as symptoms of anxiety, flashbacks, dreams and intrusive thoughts etc.

Stress of parents of intellectually disabled children

The mother and father are the first and, in many ways, the most important socializing agents. The relationship of the intellectual disabled child with his parents is more important than the relationship of the intellectually normal child with his parents. The parents of the intellectually disabled child are in a different situation. For the family of an intellectual disabled child, the situation is more complicated and hazardous. The particular handicaps of the child, the slowness of his development, the necessity of special arrangements for his physical care, training and companionship and adjustments which must be made in the family's expectations for the future, combine to create pressure on the parents which tends to disrupt the normal family equilibrium. Added to this pressure may be tensions created by the child's difficulties in interpersonal relationships, his slowness to

learn, his immature self-control and his handicap in communication. At the same time, the parent child relationship intensified by the child's prolonged immaturity and isolation from a peer group. The child remains emotionally and economically dependent upon his family throughout his life. Many families drastically alter their way of life because of the presence of an intellectually disabled child in the family circle to withdraw from community activities completely. Unwantedness and rejection of a child may sometimes be openly shown by parents but more often is disguised. The child may be placed in an institution or in a reformatory or a boarding school not because circumstances demand it but because the parents do not want to be bothered by the responsibility of bringing up the child. An intellectually disabled child in a family is usually a serious stress factor for the parents. It often requires reorientation and reevaluation of family goals, responsibilities and relationships.

Aim:

- To study the stress level of parents of intellectually disabled children.

Objectives:

- To study personal stress amongst the parents of intellectual disabled children.
- To study sex differences in the stress experienced by the parents of intellectual disabled children.
- To study the role of ordinal position in the stress experienced by the parents of intellectual disabled children.

Review of literature

Majumdar, M., Pereira, Y. & Fernandes, J. (2005) compared the stress perceived by parents of mentally retarded and normal children are limited. The aims were (i) To find whether there exists a difference in the perceived stress between both the parents of mentally retarded children, (ii) to study whether these stresses occur more frequently in parents of mentally retarded children compared with those of normal children, and (iii) to find any correlation between the severity of perceived stressors and the anxiety state of these parents. This study was conducted in the Child Guidance Clinic of a tertiary care psychiatry hospital. The study sample, comprising 180 subjects, was categorized as: group A (60 parents of profound to moderately mentally retarded children), group B (60 parents of mild to borderline mentally retarded children) and group C (60 parents of children with normal intelligence), which served as the control group. Each parent was evaluated using the Family Interview for Stress and Coping (FISC) in Mental Retardation, and the Hamilton Anxiety Rating Scale (HARS). Parents in group A had a significantly higher frequency of stressors and level of anxiety as compared to those in groups B and C. A positive correlation was found between the level of anxiety and stressors. Multifaceted factors made parents in groups A and B more vulnerable to stress compared with parents in the control group.

Gupta, R. & Kaur, H. (2010) examined stress among parents of children with intellectual disability. 102 parents formed the sample of this study, 30 of whom had children without disability. A stress assessment test with internal validity of 0.608 was utilised. This test has two parts: physical and mental, former with 19 items and latter with 21 items. T test was applied to check differences in stress, gender differences, and differences in mental and physical stress. Results show that, most parents of children with intellectual disability experience stress, physical and mental stress are significantly correlated, gender differences in stress experienced occur only in the mental area, and parents have higher mental stress score as compared to physical stress.

Chourasiya, S., Baghel, A., Kale, S. & Verma, A. (2018) studied the stress perceived by the families having mentally retarded children and to find out the various factors influencing the

perceived stress. 100 families and102 mentally retarded children were studied. Section I of family interview for stress and coping in mental retardation (FISC-MR) was used to find out the family burden of care. 47.97% of fathers and 68% of mothers are in the age group of 30-40 years. The severity of retardation was mild in 36 children, moderate in 46 children while 20 had severe retardation, 32% of mother feel mild stress of which 59.3% having education level up to degree college. 61% of mother showing moderate stress of which 68.8% having education level up to degree college. (67.3%) nuclear families show mild stress while only 22 (52.3%) joint families show mild stress. Living with and caring for the person with MR is very stressful and burdensome. High level of stress and burden is associated with increased level of disability; it being the maximum in the caregivers of persons with severe to profound Mental Retardation.

Methodology

Sample size:

The effective sample comprised of 100 parents of intellectually disabled children. It was divided, as 50 parents of intellectually disabled girls and 50 parents of intellectually disabled boys from different age group. The sample was collected from different schools of Nashik.

Tools Used:

- Personal Stress Source Inventory (PSSI) by Arun Singh, Ashish K. Singh and Aparna Singh
- General Information Questionnaire

Description of Tools:

Personal Stress Source Inventory developed by Arun Singh, Ashish K. Singh and Aparna Singh consist a set of 35 items or personal source of events. The inventory is available both in Hindi and English versions. The scoring of PSSI is very simple. Every item marked by as 'Seldom' by the testee is given a score of 1, marked as 'Sometimes' is given a score of 2 and marked as 'Frequently' a score of 3. Higher the score the higher is the magnitude of personal stress. Likewise, lower the score, lower is the magnitude of personal stress. The maximum score of PSSI is 105.

Procedure of Data Collection:

Prior permission was obtained from the principal of the special school. Parents were informed about the research. Timing was allotted to parents as per the management schedule and convenience of parents. Parents were made to sit comfortably. Good rapport was built with the parents. They were assured the results will be kept confidential. They were asked to clarify with the researcher, in case of any difficulty. There was no time limit to complete the questionnaire, but were asked to work fast. Filled up forms were collected and the parents were thanked for their cooperation.

Statistical Treatment

The data was analyzed using descriptive and inferential statistics.

Result and Discussion

The present investigation was aimed at studying the stress level experienced by the parents of intellectually disabled children. For this a sample of 100 parents of intellectually disabled children were selected randomly. The sex ratio of intellectually disabled children was 1:1.

The data obtained from the parents is depicted in table no. 1.

Table no. 1 Frequency and percentage of parents of intellectually disabled child experiencing different levels of stress.

Sr.No.	Sex of the Child	Frequency	Percentage	Level of Stress
1.	Boys	01	2	Low
		48	96	Moderate

		01	2	High
2.	Girls	01	2	Low
		48	96	Moderate
		01	2	High

Observation of table no – 1 reveals that 96% of parents of intellectually disabled boys experienced moderate level of stress, 2% of parents experienced high level of stress and the remaining 2% experienced low level of stress. Same pattern was observed with the parents of intellectually disabled girls.

For further analysis the mean and SD of stress levels of experienced by parents of intellectually disabled children was computed and is displayed in table no. – 2.

Table No. 2 Mean and SD of stress levels of parents of intellectually disabled children.

Sex of the Child	Mean	SD
Boys	55.28	11.90
Girls	60.08	11.42

Examination of table no. 2 reveals that the mean level of stress experienced by parents of intellectually disabled boys is 55.28 with an associated SD 11.90. The girls' parents revealed stress levels mean as 60.08 and SD 11.42. Thus, it is seen that the levels of stress experienced by the parents of intellectually disabled children is moderate level of stress.

The parents experienced stress because of the future of their children, their lack of motor coordination, their inability to tackle daily hassles of life, society mocking at them and many times parents themselves feel guilty.

Though there appears to be a difference in the stress levels of parents of intellectually disabled boys and girls, it is not possible to say confidently that the 2 groups differ significantly only on the basis of descriptive statistics. Hence, the data was subjected to one way ANOVA.

Table No. 3 Complete summary of one-way ANOVA of sex differences in the stress experienced by the intellectually disabled children.

Source of Variation	DF	SS	MSS	F Ratio
Between Samples (Girls Vs Boys)	1	761.76	761.76	4.43*
Within Sample	98	16849.08	171.92	
Total	99	1761084		

***Significant at 0.05 level**

As per table no – 3, F value associated with the sex differences in the stress experienced by the parents of intellectually disabled children is 4.43, which is significant at 5% level for df 1 and 98. This means there is a significant difference between the stress of parents of intellectually disabled girls and boys.

Examination of table no – 2 revealed that the mean score of stress of parents of intellectually disabled girls is 60.08 with an associated SD of 11.42 as compared to parents of intellectually disabled boys who revealed a mean of 55.28 with an associated SD of 11.90.

Thus, it can be said confidently that the parents of intellectually disabled girls have more stress than parents of intellectually disabled boys. The probable reasons could be undeveloped self-help skills, abusing behavior by the society, pubertal

problems, marital pressure, life style changes etc. Also, the thought how to send the girl outside and the girl cannot be left alone at home for fear of sexual abuse. All these factors increase the stress of the parents of intellectually disabled girls.

The next objective of the study dealt with influence of ordinal position of the intellectually disabled children on the stress experienced by the parents. The values are depicted in table no. 4

Table No. 4 Mean and SD of stress of parents of intellectually disabled boys according to their child's ordinal position.

Factor	Sex	Ordinal Position	Frequency	Mean	SD
Parental Stress	Parents of mentally retarded boys	1	24	52.83	11.70
		2	12	54.58	8.61
		3	13	60.07	11.02

As seen in table no. 4 the total sample consisted of 50 parents of intellectually disabled boys which were divided as per their child's ordinal position.

A total no of 24 parents had their first child as intellectually disabled. The mean of stress level experienced by the parents is 52.83 with an associated SD 11.70. twelve parents experienced a mean stress level of 54.58 (SD=8.61) who had their 2nd child as intellectually disabled. The remaining i.e 13 parents revealed a mean stress level of 60.07 (SD=11.02) who had their third child as intellectually disabled.

Though there appears to be a difference in the mean value of stress experienced by parents of intellectually disabled children with respect to ordinal position, it is not possible to infer confidently on the basis of descriptive statistics hence the data was subjected to CR test. The data is displayed in table no – 5.

Table No. 5 Mean, SD and 't' value of stress of parents of intellectually disabled boys respect to ordinal position.

Ordinal Position	Size of Sample	Mean	SD	't' value
1 and 2 Ordinal position - 1 Ordinal position - 2	24	52.83	11.70	0.50
	12	54.58	8.61	
2 and 3 Ordinal position - 2 Ordinal position - 3	12	54.58	8.61	1.39
	13	60.07	11.02	
1 and 3 Ordinal position - 1 Ordinal position - 3	24	52.83	11.70	1.87
	13	60.07	11.02	

The computed 't' value 0.50 for ordinal position 1 and 2 is non-significant as the computed value is less than the table value. Similarly, when ordinal position 2 and 3 was treated with 't' test, it yielded a 't' value of 1.39 which was again less than the table value. So, also ordinal position 1 and 3 yielded a non-significant 't' value 1.87.

Thus, it was noted that there was no significant difference in stress of parents of intellectually disabled boys; whatever, may be the ordinal position of the child.

Hence, it can be concluded that all parents experienced similar level of stress, irrespective of their child's position.

Table No. 6 Mean and SD of stress of parents of intellectually disabled girls according to their child's ordinal position.

Factor	Sex	Ordinal Position	No. of Sample	Mean	SD
Parental Stress	Parents of intellectually disabled girls	1	23	59.13	11.74
		2	17	61.82	9.95
		3	10	62.9	12.10

As seen in table no.6 the total sample consisted of 50 parents of intellectually disabled girls which were divided as per their child's ordinal position. A total of 23 parents had their first child as intellectually disabled. The mean of stress level experienced by the parents is 59.13 with an associated SD 11.74. Seventeen parents experienced a mean stress level of 61.82 (SD – 9.95) who had their 2nd child as intellectually disabled. The remaining i.e. 10 parents revealed a mean stress level of 62.9 (SD = 12.10) who had their child as intellectually disabled.

Though there appears to be a difference in the mean value of stress experienced by parents of intellectually disabled children with respect to ordinal position. It is not possible to infer confidently on the basis of descriptive statistics hence the data was subjected to CR test. The data is displayed in table no. 7.

Table No. 7 Mean, SD and 't' value of stress of parents of intellectually disabled girls respect to ordinal position.

Ordinal Position	Size of Sample	Mean	SD	't' value
1 and 2 Ordinal position - 1 Ordinal position - 2	23	59.13	11.74	1.38
	17	61.82	9.95	
2 and 3 Ordinal position - 2 Ordinal position - 3	17	61.82	9.95	0.23
	10	62.9	12.10	
1 and 3 Ordinal position - 1 Ordinal position - 3	23	59.13	11.74	0.83
	10	62.9	12.10	

The calculated 't' value 1.38 for ordinal position 1 and 2, is non-significant as the computed value is less than the table value. Similarly, when ordinal position 2 and 3 was treated with 't' test, it yielded a 't' value of 0.23 which was again less than the table value. So also, ordinal position 1 and 3 yielded a non-significant 't' value 0.83.

Thus, it was noted that there was no significant difference in stress of parents of intellectually disabled girls. Whatever may be the ordinal position of the child.

Hence, it can be concluded that all parents experienced similar levels of stress, irrespective of their child's ordinal position.

Conclusion

The findings of the present study from statistical treatment an analysis of the data revealed the following:

- The parents of intellectually disabled girls have more stress than parents of mentally retarded boys.
- Ordinal position of the intellectually disabled child failed to influence the stress level experienced by the parents of intellectually disabled children.

Recommendations

- School should arrange for counselors so that parents can be properly guided.
- School or institutions should provide vocational training as a means of earning to intellectually disabled children through which parents can also feel secure for their child.
- Government should organize workshops on stress management for parents, which will enable them to cope with stress.
- Through guest lectures parents should be motivated to go for recreational activities to relieve their stress.

Suggestions

- Specific variables of stress such as stress related to emotional, social, physical, financial, moral area can be included in the research.
- Comparative study can be done of stress of parents of intellectually disabled children with that of normal children according to ordinal position of the child.

Limitations

The conclusions drawn on the basis of the findings of this study may therefore be considered in the following limitations –

- Investigator could study only 100 sample.
- Only one variable stress was studied.
- As it is a survey, result obtained cannot be generalized.

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Exploring the Impact of Introversion and Extroversion on Self-Esteem

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Abstract

Self-esteem, a critical component of adolescent development, refers to the overall sense of self-worth or personal value an individual holds. During adolescence, a time marked by significant emotional and social changes, self-esteem plays a crucial role in shaping mental health and future well-being. Personality traits, which encompass enduring patterns of thoughts, feelings, and behaviours, are significant predictors of self-esteem during this period. Traits such as extraversion, agreeableness, and emotional stability have been shown to influence how adolescents perceive themselves and navigate their social environments. The study was conducted to explore the impact of personality traits (extraversion and introversion) on the self-esteem of adolescents. A total of 90 participants, were selected from Nagpur city for this research. They were surveyed using Rosenberg Self-Esteem Scale (RSE), and NEO-FFI personality test. The study revealed that sixty percent adolescents revealed low level of self-esteem. Further it was found that adolescents with extraversion as their personality trait had higher self-esteem.

Key words: Adolescents, Personality traits, Self-esteem

Introduction:

Self-esteem, the evaluation of one's own worth, is deeply influenced by personality traits, which shape how individuals perceive themselves and interact with the world. Personality traits such as extraversion, conscientiousness, and emotional stability play a significant role in determining self-esteem levels. For example, individuals who are naturally more extraverted often experience higher self-esteem due to positive social interactions and feedback, while those who are more neurotic may struggle with lower self-esteem due to tendencies toward anxiety and self-doubt. Understanding the impact of these traits on self-esteem is crucial, as it helps explain why people with different personalities may experience varying levels of self-worth and highlights the importance of nurturing traits that promote a positive self-concept.

Self-esteem

The notion of self-esteem is determined as a disposition which a person possesses and which represents his/her judgment of his/her own value [1-3]. Coopersmith (1967) defines self-esteem as a set of qualities which an individual observes within himself/herself. According to modern concepts, self-esteem is also defined as respect for one's own value and importance, as a willingness to be a responsible person and to behave responsibly toward others. Self-esteem appears when a person begins to appreciate and highly value his/her qualities or traits. In other words, self-esteem is the result of evaluating one's own value, i.e., the outcome of an evaluative orientation toward one's innermost self; it is the level of belief in one's own values, the power of belief in one's own ideas and thoughts, as well as the depth of confidence in one's own actions (Baumeister, 2013). Self-esteem is not inherent, nor inherited, but it is established, and it changes throughout lifespan under the influence of relationships with others, especially parents [1].

The optimum rule applies to self-esteem; when a person has too little of it, he/she functions below his/her potential, and when he/she has too much of it, he/she acquires narcissistic personality traits. High self-esteem is a key factor for success, adequate dealing with failure, and a

subjective sense of contentment in life. Persons with high self-esteem take risks more courageously, do not set too high demands on themselves, and highly value themselves. To have high self-esteem means to have a sense of honour and dignity in relation to oneself, one's own choices, and one's own life. A person with a high self-esteem has the courage to stand up for himself/herself when he/she is treated below the level he/she believes he/she deserves. One person may be more competent than the other, more experienced, and with higher education, but if the level of his/her self-esteem is lower, he/she is less likely to fight for his/her success. Individuals with high self-esteem deal better with failure compared to those with low self-esteem, feel happier in life, and have lower anxiety.

Many authors, as well as self-esteem scales, are based on the idea of self-esteem as a stable trait. However, a newer direction of self-esteem research is that high self-esteem can be divided into stable and unstable (fragile) self-esteem. A fragile high self-esteem is when a person shows both, with words and behaviour, that he/she has a positive attitude about himself/herself (explicitly), and on an unconscious level he/she has a negative attitude about himself/herself (implicitly). Such persons are prone to destructive and aggressive behavior when their self-image is disturbed. Namely, Kernis et al. (2000) have shown that persons with unstable high self-esteem behave as if their self-esteem is always in question, hence they cannot take a critique, have a defensive attitude in interaction with others, show more levels of anger and hostility, and are highly selective in accepting feedback. Furthermore, they brag about their successes to their friends, while in doing so using self-magnification and being more self-burdened. The feeling of one's own self-esteem in mature years is also based on respect for others. Persons with high self-esteem do not perceive other people as threats, nor do they think ahead that they will be rejected, humiliated, deceived, or betrayed by others because they are aware of themselves and their qualities. Thus, they treat others with respect, justness, and good intentions.

High self-esteem is desirable, especially in individualistic cultures, because it is a predictor of success in various spheres of life, but some social psychologists have dealt with the research of negative sides of high self-esteem. One of the more significant studies relates to the connection between self-esteem and anger and hostility. A group of scientists (Kernis et al., 1989) compared the level and stability of self-esteem with the amount of anger and hostility which individuals experience. Self-esteem stability was tested by multiple global self-esteem tests in natural conditions. The researchers have found that the predictor of anger and hostility is not only the level of self-esteem but also its stability. High but unstable self-esteem is in a statistically significant correlation with the extremely high tendency of experiencing anger and enmity, or hostility.[4]

Persons with a **lack of self-esteem** have doubts about their abilities and they take risks only when they are certain that they are fully competent and that they meet all the conditions. Furthermore, researches have shown that low self-esteem leads to certain negative occurrences, such as: delinquent behavior, depression, bulimia, tendency for mental illnesses, and dissatisfaction with relationships.

Baker and McNulty (2013) state that persons with low self-esteem prefer safety and familiar situations, avoid challenging goals and, thus, reflect low self-esteem. They are not direct in communication, they often fear to openly say what they think and feel, first and foremost because they themselves are uncertain in their thoughts, and then because they fear the reactions of others. Such persons cannot stand failures well. Every time they do not achieve their goal, to them, that is another proof that they are worthless and unsuccessful. Trapped in their thinking and self-evaluation scheme, they usually do not even consider other reasons for

failure. Persons with lower self-esteem often think that other people do not have a high opinion of them, as well, which makes them feel rejected and they rarely decide to initiate social contacts.[7] A fewer number of social contacts leads to fewer opportunities for creating deeper interpersonal relationships, from which a person can expect social support. Thus, low self-esteem affects the size and the quality of a person's social network.

Personality Traits

Personality, often described as the unique fingerprint of an individual's psyche, is a captivating blend of inherent predispositions and acquired behaviours (Allport, 1937; McCrae & Costa, 1999). It's an interplay of traits, attitudes, and habitual ways of thinking, feeling, and acting that color every aspect of one's life. Imagine, it as a multifaceted gem, with each facet representing a different dimension of our being, from the warmth of Extraversion to the depth of Openness. The Big Five model, like a compass guiding us through this intricate terrain, offers a structured framework to understand these dimensions and their influence on our thoughts, emotions, and actions [1]. The Big Five model describes five dimensions of personality: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to experience. Extroversion implies that individuals are sociable, while introversion implies that they are quiet and reserved.

Extraversion is characterized by openness, assertiveness, and a high level of energy. Persons with a high score on extraversion are more open, more persistent, more talkative, and more social than those with a low score on extraversion, who are shy, quiet, and aloof. Extraversion is associated with values of achievement and hedonism, but also with goals relating to an exciting lifestyle.

Agreeableness means that persons are cooperative and kind, and not rough. This dimension is characterized by benevolence and trust. It can be seen as a combination of friendship and harmonization. Persons with a high score in this dimension are warm, sympathetic, and honest, while persons with a low score in this dimension are unkind, often rude, and sometimes even cruel. Agreeableness is associated with harmonious family relationships, good partnership relationships, but also with prosocial values.

Conscientiousness is characterized by orderliness, responsibility, and reliability; hence this trait is sometimes called reliability, as well. Conscientious persons are hardworking, disciplined, pedantic, and they devote a lot of time to organization. These are persons who are intrinsically motivated and who make a lot of effort to be successful in what they do. Conscientiousness is associated with goals of achievement, but also with goals relating to interpersonal relationships. Therefore, it can be said that conscientious persons are oriented toward goals, the execution of a task, and that they are reliable and punctual thereby.

Neuroticism is characterized by uneasiness and a polar opposite of emotional stability and such individuals are prone to experiencing anxiety, depression, and irritation. Persons with a high score on neuroticism are insecure, often have mood swings, while emotionally stable people are calmer, more relaxed, and more stable. Also, a high score on neuroticism suggests suggestibility or susceptibility to suggestion, lack of persistence against obstacles, and poor fluency, or the existence of rigidity. Also, characteristics of neuroticism include the feeling of inferiority, nervousness, avoidance and intolerance of effort, dissatisfaction, sensitivity, irritability, and touchiness. On the other hand, emotional stability is associated with strategy, i.e., the way in which a person overcomes stress and various obstacles in life. Emotionally stable persons do not get disturbed, except when the issues in question are very strong stressors for them personally. Emotionally stable persons can experience neurosis symptoms only when in a situation of long-term and strong stress.

Openness to experience is characterized by originality, curiosity, and ingenuity. This factor is sometimes called culture because of its emphasis on intellect and independence. Individuals open to experience have broad interests and a fine taste for art and beauty. Persons with a high score in this dimension are creative, imaginative, and since they have a broad range of interests, like to explore the unknown, while persons with low scores in this dimension are of conventional appearance and behaviours, narrowed interests, prone to conservative attitudes, and tend to prefer what is already known in relation to the unknown. Openness to experience is often associated with autonomy.

Significance of the study:

Adolescence is a critical age and, in this stage, they need more attention, love and acceptance. Most of them feel confusion or in the words of psychologists often are in the identity crisis that also increases their vulnerability. Maybe that is why education about self-esteem in adolescents is desirable. Considering the close relationships between personality traits and self-esteem, it was an attempt to study the impact of personality traits (extraversion and introversion) on the self-esteem of adolescents.

Aim: To study the impact of personality traits (extraversion and introversion) on the self-esteem of adolescents.

Objectives:

1. To find the level of self-esteem among adolescents.

2. To measure the level of extraversion and introversion among adolescents.

3. To explore the impact of personality traits (extraversion and introversion) on the self-esteem of adolescents.

Review of Literature

Sharma U. & Venkatesan M. (2021) studied whether personality and self-esteem influence happiness of Delhi-NCR graduates or not, and also whether they differ on the variables based on gender, and whether they are currently studying or working. The present study was exploratory in nature which used expost facto research design. A sample of 102 graduates of Delhi-NCR region in the age group of 20-25 years were identified for the study using purposive sampling method. The tools used were NEO-FFI scale, Rosenberg self-esteem scale and Subjective happiness scale. This study had applied both descriptive statistics and multivariate statistics for analyzing the data. The results revealed that self-esteem, extroversion, conscientiousness, and neuroticism were correlated with happiness. Also, extroversion, conscientiousness, and self-esteem were positively correlated with happiness, whereas neuroticism was negatively associated with happiness. No gender differences were seen on all the three variables. But there was a significant difference between student and working young adults on extroversion, neuroticism, conscientiousness and happiness. These findings would help graduates to work on their personality and self-esteem to bring improvement in their happiness.

Bojanić Ž., Nedeljković J., Šakan D., Mitić P. M., Milovanović I. and Drid P. (2019) examined whether psychological variables which make up basic dimensions of personality and self-esteem distinguish competitors in combat sports from competitors in team sports. The research included 149 respondents, aged 19 to 27 years. The Self-Esteem Scale questionnaire was used to measure self-esteem. The BFI inventory was used to measure personality traits according to the Big Five model: Extraversion, Neuroticism, Conscientiousness, Agreeableness, and Openness to Experience. Both mean differences and simple discriminant function analyses for competitors in combat/team sports revealed that self-esteem, neuroticism, and conscientiousness were the most important factors distinguishing the two groups. Practical implications, limitations, and

future research directions were discussed.

Raju N. (2019) studied self-esteem among adolescents. Non-experimental correlational descriptive survey research design or ex-post facto research design was used in the study. In this study, purposive sampling technique was used to select residential school. Simple random sampling technique that is lottery method was used to select 60 adolescents who were studying in residential school. Level of self-esteem was assessed by using Rosenberg self-esteem scale and Data collected was analysed by using descriptive and inferential statistics. It revealed that highest that is 55% of adolescents had normal level of self-esteem, 36.67% of adolescents had high level of self-esteem and 8.33% adolescents had low level of self-esteem. There was significant association of self-esteem with selected demographic variables such as Age (in years), year of education, type of family, fathers education status, mothers education status, occupation of the head of the family and number of siblings except gender and monthly income of the family. The findings of the study showed that adolescents may have varied level of self-esteem. So, there is great need of interventions to promote adolescents self-esteem in order to maintain healthy mental health of adolescents.

Varanarasamma E., Kaur A. & Muthu N. (2018) investigated the relationship between personality traits and self-esteem among university students in Malaysia. The research examined the predictive value of Big Five Personality Factors for university students' self-esteem and surveyed the gender difference in Big Five Personality Factors. Participants of the study were 515 university students (258 females and 257 males). The sampling method used for the study was purposive sampling. Two highly versatile instruments were used - Big Five Personality Factor's Scale (Goldberg, 1999) and Coopersmith's Esteem Scale (CSEI). Results showed a significant positive correlation of self-esteem and personality. Simultaneous multiple regression of self-esteem on the personality traits sub scales, revealed that the extraversion, agreeableness, conscientiousness and openness were significant positive predictor and neuroticism versus emotion stability was significant negative predictor of the self-esteem. The results of analysis t-test indicated gender difference in male and females in two personality traits which are conscientiousness and neuroticism while no significant gender difference extraversion, agreeableness and openness traits.

Kenneth K. (2014) investigated the correlation of self-esteem with that of personality type of youth boys and girls who came to attend the one-month Leadership Internship program organized by RGNIYD during June 2012.The sample comprised of 41 youths from all over the country. To measure the variables under study, participants were administered with standardized tools available. To determine whether the participant was neurotic or extroverted, the Eysenck Personality Inventory was used; the Rosenberg Self-Esteem Scale was used to determine the self-esteem of participants. The data thus collected were statistically treated with coefficient of correlation to find the relationship between the two variables under study. Alternate directional hypothesis was found to be proved i.e. “Self-esteem will be positively correlated with extraversion and negatively with neuroticism”. Results have shown a significant positive correlation of self-esteem and personality (Extrovert Personality) of the participants.

The above literature review has given an insight into the self-esteem and personality traits. Based on them, the research was designed to study self-esteem as a function of extraversion and introversion.

Research methodology

Sample: The effective sample of the present study comprised of 90 adolescents that is 45 extroverts and 45 introverts with an age range of

16-19 years belonging to middle socio-economic strata. The data collection was done randomly from Nagpur region.

Tools used: The following tools were used-

- **Rosenberg Self-Esteem Scale:** Self-esteem was assessed with the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965); a commonly used and well-validated measure of self-esteem. Responses were measured with a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree) yielding scores between 10 and 40 with higher scores indicating higher self-esteem. The alpha reliability ranged from 0.85 to 0.88 across assessments. A self-esteem score between 10-20 indicates low self-esteem, 21-30 indicates moderate self-esteem, and a score between 31-40 indicates high self-esteem.

- **NEO FFI Personality Test:** NEO FFI (Costa & McCrae, 1992) is a 60-item self-report instrument used to measure the five personality domains according to the FFM: Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness (12 items per domain). The NEO FFI includes self-descriptive statements that participants respond to using a 1 (strongly disagree) to 5 (strongly agree) Likert-type scale. Scores for each domain are calculated by summing the responses. Each of the five domains of the NEO FFI has been found to possess adequate internal consistency and temporal stability ($\alpha = 0.68$ to 0.86, $r = 0.86$ to 0.90). For the present research work- only one factor extraversion was scored and studied.

Procedure for data collection:

After selecting and finalizing the tools for data collection, the investigator took prior permission from the subjects and discussed in detail about the investigation and sought a convenient time from them for collecting the necessary data and explained about the nature and purpose of the study. The consent was taken and the adolescents were assured of keeping the data confidential. In the first phase, good rapport with the adolescents was established and instructions of both the standardised psychological test used in the study were made clear. The investigator collected both the inventories and thanked all the adolescents for their cooperation. The inventories thus collected were scored as per the prescribed procedure and the data was recorded and interpreted.

Variables under study:

- Dependent variable: Self-esteem
- Independent variable: Extroversion vs Introversion

Hypothesis: Adolescents with extraversion will have higher self-esteem than adolescents with Introversion.

Statistical Treatment: Initially, the data was treated with mean and standard deviation and for further inferential purpose, t-test was employed.

Result Analysis:

The first objective of the study was to assess the levels of self- esteem and personality trait of extroversion and introversion of adolescents. The results are displayed in the following table 1:

Table-1– Frequency and Percentage of levels of Self-esteem

Level of self esteem	Frequency	Percentage
Low	54	60%
Moderate	34	37.8%
High	02	2.2%

Table 1 shows the frequency of adolescents according to their level of self-esteem. The majority of adolescents i.e. 60% have revealed low self-esteem, 37.8% of adolescents are found to be of moderate self-esteem level and only 2.2% have exhibited high self-esteem. The next objectives were to measure the level of extraversion and introversion among adolescents and to explore their impact on the self-esteem of adolescents. The results are displayed in the following table 2:-

Table-2 - Mean, SD and t-value with respect to Self-esteem

	Extrovert	Introvert	't' value	'p' value
Mean	22.33	17.27	**4.29****	p<0.01
SD	3.31	3.15		

****significant at 0.01 level**

From the table 2, it is seen that the data is distributed according to Normal Probability Curve. The results of t-test showed that the mean score of self-esteem with respect to their personality trait of extraversion (M = 22.33, SD = 3.31) was significantly greater than the adolescents with traits of introversion (M = 17.27, SD = 3.15). Moreover, the calculated t-value of the analysis came out to be **4.29** which is much greater than the table value of 2.46 at 0.01 level of significance. Thus, it can be asserted that there exists significant difference among the self-esteem of adolescents with respect to their personality trait extroversion vs introversion. Thus, the hypothesis stated that adolescents with extraversion will have higher self-esteem is accepted.

This could be because adolescents with higher levels of extraversion have outgoing nature which leads to frequent social interactions, where they often receive positive feedback and validation from peers. These interactions help them feel accepted and valued, which boosts their sense of self-worth. Additionally, extraverted adolescents typically experience more positive emotions and develop strong social skills, which contribute to their social success and reinforce a positive self-image. Their resilience to rejection and active participation in various activities further enhance their confidence, creating a positive feedback loop between their extraversion and self-esteem.

Similar results were reported by Kenneth K (2014) that self-esteem was positively correlated with extraversion. A study by Erol and Orth (2011) examined the relationship between the Big Five personality traits and self-esteem across different age groups. They found that extraversion was significantly associated with higher self-esteem during adolescence, suggesting that the social and emotional benefits of extraverted behavior contribute to a stronger sense of self-worth. Similarly, a study by Robins, Tracy, Trzesniewski, Potter, and Gosling (2001) explored the development of self-esteem from adolescence to adulthood and found that extraversion was one of the strongest predictors of self-esteem. These studies highlight how the social engagement and positive affect characteristic of extraversion can enhance self-esteem during the critical developmental period of adolescence.

Conclusion:

- **Adolescents with extraversion as their personality trait were found to have higher self-esteem.**

This study found significant impact of extraversion and introversion on self-esteem levels in adolescents. Those identified as having predominantly extraverted personality traits tended to exhibit higher levels of self-confidence, social comfort, and self-worth. Extraverted adolescents generally benefit from increased social interactions, which provide positive feedback and support, reinforcing their self-esteem.

- **Sixty percent of adolescents revealed low levels of self-esteem.**

This statistic indicates a concerning prevalence of low self-esteem among adolescents, with 60% of the sample displaying low self-regard, feelings of inadequacy, or negative self-perception. Low self-esteem in adolescence can stem from multiple factors, such as academic

pressures, social comparison, family dynamics, or societal expectations, all of which are particularly impactful during this developmental stage. This finding may underscore the need for interventions, whether through family, school, or mental health resources, to address self-esteem issues early on. Additionally, it points to the importance of considering personality traits like introversion and extroversion in understanding the broader picture of adolescent mental health and self-image.

Limitations:

- The data was limited to only 90 adolescents.
- Only one personality trait (extraversion vs introversion) was considered.
- Gender difference was not studied.

Suggestions

- The study could have included the intervening variables like conscientiousness, openness to experience, etc.

Recommendations

- Teachers and Parents to be aware of the self-esteem and provide conditions so that students can experience success.
- Guidance services should be made available to the adolescents.

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BLACK TEA AS A SKIN CARE INGREDIENT A REVIEW

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Abstract

The concept of beauty and cosmetics is as ancient as mankind and civilization. Cosmetics alone are not sufficient to take care of skin and other body parts, it requires association of active ingredients to check the damage and ageing of the skin. Traditional use of plants for cosmetic purposes for skin care are in the form of infusions, extracts poultices etc. Plant sources are rich in vitamins, antioxidants, oils, hydrocolloids, proteins, terpenoids and other bioactive compounds which have functions in the scope of cosmetics such as anti-aging, anti-oxidant, emollient effect etc. Plants can be utilized for cosmetics in different forms such as a part of plant or total extract.

India is the largest tea growing country in the world. Tea is one of the most widely consumed beverages in the world, next to water. It is made from young leaves and unopened leaf buds of tea plant Camellia sinensis (Linne) O-Kunte belonging to family Theaceae. It can be categorized into 3 major types, depending on the level of fermentation, i.e., Green, White (unfermented), and Black (fermented) tea. All types of tea come from the same tea plant. Each type of tea has a distinct composition, depending upon the geographical location, agricultural practices, maturation, as well as the method of processing.

During the literature survey, it was found that black tea contains polyphenols (catechins) and its biological actions play an important role in skin care.

The present review gives the insights of black tea, its properties, composition and applications for skin.

KEY WORDS : Tea plant, Black tea, Camellia sinensis, polyphenols, catechin, skin care.

INTRODUCTION

Camellia sinensis (*Linne*) O-Kunte belonging to family Theaceae [1][2]. It is commonly known as Tea and is made from the young leaves and unopened leaf buds of tea plant (fig 1) [3]. It is categorized into 3 major types, depending on the level of fermentation, i.e., Green, White (unfermented), and Black (fermented) Tea (fig 8). It contains polyphenols (catechins) which are beneficial for skin.

BLACK TEA

Description

It consists of reddish brown to almost black, much shriveled leaf fragments, the original shape of which can only be determined after boiling and steeping in water. Higher quality tea consists of the leaf buds which are finely pubescent on the lower surface (visible under magnification). The margin is finely serrate, and the tip of each tooth bears a small glandular trichome. It consists of oblong-ovate, dark green, shiny leaves with a distinctly serrate margin. The fragrant flowers are up to 3 cm in diameter, with 5-6 white petals and numerous yellow stamens, appearing singly.

Figure No. 1: ***Tea Plant [4]***

Odor: Faintly aromatic **Taste:** Astringent, bitter

Cultivation: It is cultivated by picking only the young shoots more or less densely pubescent and is picked by hand to yield the best quality tea.

Classification: Numerous distinct varieties of black tea are commercially available with names that describe their grade, origin and /or quality (based on leaf age). The classification of the black tea grades is determined by particle size analysis as well as sorting by appearance (color) and method of manufacture such as crush, tear, curl (CTC) or orthodox; for example,

1. Broken pekoe (BP) is a broken CTC grade.
2. Flowery orange pekoe (FOP) is a whole leaf orthodox grade
3. Broken orange pekoe (BOP) is a broken orthodox grade

Types: These are additionally classified according to their origin; for example: Assam Black Tea is grown in the state of Assam in north eastern India and Darjeeling Black Tea is grown in the Darjeeling area of northern West Bengal, India.

Method of preparation: It is produced by partially drying (withering) the young leaves in well-ventilated chambers. This process renders the leaves pliable and flaccid so that they can be rolled, which causes some of the cell sap to exude and the leaf structure to be partially broken down. During subsequent fermentation the polyphenols (tannin precussors) are converted to oligomeric proanthocyanidins (thearubigins) and at the same time, the characteristic aroma compounds are formed. The leaves are then dried (fired) in a hot air current, sorted and packed [5] [6]. Steps of processing of black tea are summarized as [7]:

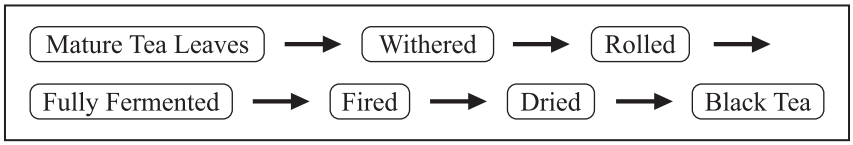

Figure No. 2: ***Flow Diagram of Processing of Black Tea***

Figure No. 3: ***Black Tea [8]***

Chemical composition:

Chemical composition varies with climate, season, horticultural practices and age of the leaf [7] and is shown in table I.

Table-1– Frequency and Percentage of levels of Self-esteem

Sr. No.	Constituents	Concentration (%)
1.	Catechins	3–10
2.	Theaflavins	3–6
3.	Carbohydrates	15
4.	Thearubigins	12–18
5.	Protein	1
6.	Flavanols	6–8
7.	Mineral matter	10
8.	Phenolic acids	10–12
9.	Volatiles	1
10.	Amino acids	13–15
11.	Methylxanthine	8–11

Cosmetic uses:

- Black tea contains polyphenols which imparts protective effect against free radicals, and are considered to be a good antioxidant. It shows a decrease in photochemical damage to the skin. Studies indicated that when green tea is oxidized to black tea, the extracts remain beneficial in preventing the early signs of UV B-induced phototoxic effects, namely, sun burn and skin thickness [10].

- It imparts skin whitening effect on the delayed tanning spots induced by the UVB irradiation by reducing melanin pigmentation, that is due to inhibiting the proliferation of melanocytes and the synthesis of melanosomes [11][12].

- It is used as effective sunscreening agent [13].

- It can effectively delay aging of skin [14]. It is used as an anti-inflammatory agent [15]. It is used as anti-bacterial agent [16][17][18], has antifungal activity [19] and also beneficial for reducing dental plaque [20].

CONCLUSION

The need for herbal ingredients has increased in the personal care industry nowadays, and they are widely used in daily life. The appearance of the human body depends on having strong teeth, glossy hair, and radiant skin. The herbal ingredients are the most advantageous over the synthetic ingredients due to its effectiveness and less toxicity. Black tea is the most popular prepared drink worldwide and is known for its antioxidant property. Tea has shown a craze in recent decades for its tremendous advantages in bioactive components, organoleptic quality, and applications in cosmetics. Present review thoroughly summarizes the cultivation, manufacturing process, types, chemical composition, and cosmetic uses. So, it can be concluded that black tea is an effective skin care ingredient due to its enriched polyphenols profile, an ultimate antioxidative entity and therefore it is beneficial for skin care, comparatively safe, produce less toxic and adverse reactions.

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The Impact of Face Acids on Skin A Comprehensive Review

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Abstract

Face acids have emerged as a cornerstone in modern skincare regimens, promising improvements in skin texture and tone. This comprehensive review delves into the diverse range of face acids, including alpha-hydroxy acids (AHAs), beta-hydroxy acids (BHAs), poly-hydroxy acids (PHAs), and others, to evaluate their efficacy and mechanisms of action. The review synthesizes existing research to assess the benefits and potential risks associated with these acids, considering factors such as skin type, concentration, and formulation. Furthermore, it explores the impact of face acids on different skin tones and textures, highlighting the need for tailored approaches. By providing a critical analysis of the available evidence, this review aims to offer valuable insights for dermatologists, skincare professionals, and consumers seeking to optimize skin health and appearance through the use of face acids.

Keywords: face acids, skin texture, skin tone, AHAs, BHAs, PHAs, skincare, skin health

Introduction:

The pursuit of radiant, youthful skin has driven a surge in the popularity of topical acids. These chemical exfoliants, such as alpha-hydroxy acids (AHAs), beta-hydroxy acids (BHAs), and poly-hydroxy acids (PHAs), have become staples in many skincare routines. Their purported benefits, ranging from improved skin texture and tone to reduced acne and signs of aging, have led to a burgeoning market of products containing these ingredients. However, while anecdotal evidence abounds, a comprehensive understanding of the impact on skin health remains essential for both consumers and healthcare professionals.

This review aims to critically evaluate the available research on the efficacy and mechanisms of action of face acids. By synthesizing existing studies, we seek to provide a clear overview of their benefits, limitations, and potential side effects. Ultimately, this review aims to offer valuable insights to guide dermatologists, skincare professionals, and consumers in making informed decisions about the use of face acids.

Understanding Face Acids

Formulations containing hydroxy acids have been used in clinical practice for decades to treat a variety of skin conditions. The most prominent representatives in this class of compounds are glycolic acid, lactic acid, and salicylic acid. Hydroxyl acid have transformed skin care since their introduction to dermatology.[1] They have been used, typically to treat acne, ichthyosis, keratoses, warts, psoriasis, photoaged skin, and other disorders.[2] In the last three decades, α-hydroxy acids have been widely incorporated into a variety of cosmetic products for daily use over long periods of time.[3] Many preparations those contain hydroxyl acids are both exfoliants and moisturizers. In low concentrations (4%-10%), they are most commonly used components of nonprescription creams and lotions that are promoted as being effective for skin aging. In high concentrations (20%), these preparations are used as chemical 'peels' to treat calluses, keratoses, acne, psoriasis, and photoaging.[4]

Acids are active ingredients that address a number of different skincare concerns depending on the molecular size of the acid and its strength. Face acids, also known as chemical exfoliants, are popular skincare products that can improve the texture and appearance of the skin.

Absolutely, the trend of incorporating serums

with active ingredients, especially acids, into skincare routines has become quite prominent. As you've noted, acids have been a staple in beauty practices for centuries, and their modern resurgence highlights their effectiveness in addressing a variety of skin concerns.

Face acids are primarily work as chemical peel that react with the skin, remove layers of dead cells and excess oil that may lead to dullness, blemishes or clogged pores. They help in breaking the bonds that hold the skin's cells together, causing the top layer of the skin to shed, resulting in skin regeneration and smoother, clearer skin that glows from within. They can be found in high concentrations in chemical peels that are commonly used by dermatologists or in milder ones in over-the-counter products such as cleansers, masks, scrubs, moisturisers or toners.

There are three main categories of chemical exfoliants - AHAs, BHAs and PHAs. All of these are acids, but they differ in terms of penetrative ability and gentleness on the skin. [5]

Alpha-Hydroxy Acids (AHAs)

AHAs are carboxylic acids with one hydroxyl group attached to the α-position of the carboxyl group. These are water-soluble compounds derived from natural sources such as fruits and milk. They increase cell turnover and thus encourage the production of new collagen. They are gentle on the skin and thus a suitable choice for sensitive skin. The simplest representative of AHA is glycolic acid, lactic acid, and citric acid are prominent examples, each with unique characteristics and mechanisms of action. The concentration of AHAs in topical formulations can vary to achieve the desired effect, with lower concentrations commonly used for daily skincare products and higher concentrations employed in professional settings. Furthermore, novel AHAs, such as mandelic acid and malic acid, have emerged, offering additional benefits for specific skin conditions and types. These advancements in AHAs contribute to the expanding repertoire of skincare interventions and provide further opportunities for customization and tailored treatments. Clinical studies have demonstrated the efficacy of AHAs in improving skin texture, tone, and reducing the appearance of fine lines. However, it is essential to note that individual responses may vary, and factors such as acid concentration and skin type can influence the outcomes. [6]

Beta-Hydroxy Acids (BHAs)

Beta-Hydroxy acids (BHAs) are carboxylic acids having one hydroxyl group attached to the β-position of the carboxyl group. The most common BHA is β-hydroxy butanoic acid. A lipid soluble BHA is tropic acid (2-phenyl-3-hydroxypropanoicacid) Some BHAs are also considered AHAs as they contain a hydroxyl group in the α-position to one carboxyl group and in the β-position to the other carboxyl group. Malic acid and citric acid are prominent representatives in this category. BHAs are oil-soluble acids allowing them to penetrate the skin more deeply than AHA acids and dissolve pore contents that work well for unclogging pores and treat acne-prone skin. Salicylic acid is the most widely used BHA in skincare.[7]

In cosmetic and dermatology Yu RJ, van Scott EJ. Stated that salicylic acid is not BHA as in salicylic acid, both the hydroxyl and the carboxyl groups are directly attached to an aromatic benzene ring and both exhibit acidic properties. In contrast, the hydroxy groups in AHAs, BHAs, and PHAs are neutral under the conditions used in clinical and cosmetic settings. On the basis of knowledge to date, Salicylic acid does not function physiologically or therapeutically as a BHA. Salicylic acid is used in cosmetic formulations for a variety of applications, more specifically, it is fat soluble, which makes it useful in subjects with oily skin.[8]

Poly-hydroxy acids (PHAs):

A new generation of A HAs, called PHAs and polyhydroxy bionic acids (PHBAs), provide effects similar to AHAs but with less irritation responses. PHAs, such as lactobionic acid are

carboxylic acids with two or more hydroxyl groups attached to carbon atoms or an alicyclic chain. It is essential that at least one hydroxyl group be attached to the α-position. Attaching a sugar molecule to the PHA structure results in a polysaccharide known as bionic acid. Multiple skin benefits have been proven for the PHAs and PHBAs, making them ideal ingredients for use in dermatologic and cosmetic procedures. The advantage of PHS acids is that they are often antioxidant, protecting the skin from free radicals, soothing the skin, supporting the skin's natural barrier, and attracting moisture into the skin, thus promoting hydration. [8]

Mechanism of action:

Alpha-hydroxy acid (AHA)

AHAs primarily work by disrupting the bonds between corneocytes, the dead skin cells in the stratum. This disruption occurs because AHAs are weak acids that lower the pH of the skin, leading to the denaturation of proteins that form the adhesive bonds between cells. A commonly used AHA, breaks down Corne desmosomes (the structures that help maintain cell adhesion in the stratum corneum), leading to the removal of the topmost layer of dead cells by enhancing desquamation. By removing the uppermost layer of dead cells, AHAs stimulate the migration of keratinocytes (skin cells) from the deeper layers of the epidermis to the surface.[9] This accelerated cell turnover results in a fresher, more youthful appearance. The removal of the damaged, outermost layer of skin reveals a smoother texture underneath. AHAs can also enhance skin hydration by improving the skin's ability to retain moisture.[10]

Beta Hydroxy Acids (BHAs)

Unlike AHAs, BHAs are oil-soluble. This characteristic allows them to penetrate into the pores, where they can effectively exfoliate from within. This is particularly beneficial for individuals with oily and acne-prone skin, as BHAs can help to clear out clogged pores. salicylic acid, work by breaking down the bonds between corneocytes in a similar manner to AHAs but are more effective in addressing the issues within the pore. They exfoliate the skin surface and also help to remove dead skin cells and sebum (skin oil) that may be contributing to acne.[11] BHAs have anti-inflammatory properties, which can help to reduce redness and swelling associated with acne. Regular use of BHAs can lead to a smoother skin texture by reducing the occurrence of clogged pores and helping to shed the outer layer of dead skin cells.[12]

Poly-hydroxy acid (PHA)

PHAs and PHBAs provide clinically proven antiaging and skin-smoothing effects that are comparable to AHAs, while offering several therapeutic advantages. In addition, these molecules function as humectants and moisturizers, as well as providing antioxidant chelation effects. The most popular PHA marketed today is gluconolactone. In vitro and in a clinical setting, which demonstrated that gluconolactone can protect against the detrimental effects of UV radiation. They exposed fibroblast cultures obtained from the skin of transgenic mice to UVB, in the presence or absence of gluconolactone solutions.[13]

Safety and Side Effects:

The comprehension of the safety profile associated with topical formulations containing hydroxy acids holds paramount significance in ensuring not only their effectiveness but also their well-tolerated application within the field of dermatology. It is important to understand the underlying mechanisms behind the reported side effects of hydroxy acids. AHAs, such as glycolic acid, lactic acid, and citric acid, possess the ability to induce controlled exfoliation of the outermost layer of the skin, the stratum corneum. This exfoliation process promotes the removal of dead skin cells, resulting in a smoother and more even skin texture [14]. However, this exfoliation can also lead to mild skin irritation, manifesting as redness, and the sensation of stinging or

burning upon application. Questions have been raised about the safety of prolonged use of HA-containing products on sun-exposed skin. A number of clinical studies have reported that topical application of glycolic acid can increase sensitivity of the skin to solar-simulated radiation [15].

In 1998, the Cosmetic Ingredient Review (CIR) Expert Panel assessed α-Hydroxy Acids (αHAs) and found them to be non-mutagenic, non-carcinogenic, and non-sensitizing, with no reproductive or developmental toxicity. To minimize skin irritation, the CIR recommended αHA concentrations be limited to less than 10% and the pH of products to be at or above 3.5. They also advised that αHA products should be formulated to avoid increasing sun sensitivity, with a recommendation for daily sun protection. Similarly, for Salicylic Acid (SA) used at concentrations below 3%, the CIR Panel recommended considering its potential effects on skin sensitivity to sunlight in product formulation and use [16]. In addition to the potential for skin irritation, AHAs have been shown to increase the skin's sensitivity to ultraviolet (UV) radiation, thereby increasing the risk of sunburn and UV-induced damage. This is primarily due to their exfoliating properties, which thin the stratum corneum, reducing its ability to provide a natural barrier against UV rays. Consequently, the skin becomes more susceptible to sunburn and UV-induced damage, including premature aging and an increased risk of skin cancer [14]. It is, therefore, crucial for healthcare providers to educate patients undergoing AHA treatment about the importance of sun protection. This involves advising the regular use of broad-spectrum sunscreens with high sun protection factors, the adoption of protective clothing, and the avoidance of prolonged sun exposure, especially during peak hours. [16]

Daily skincare treatments with AHAs usually involve lower concentrations in creams or serums to provide gentle, consistent exfoliation without damaging the skin. This approach helps to improve skin radiance and smoothness while minimizing the risk of irritation. For more intensive results, higher concentrations of AHAs are used in in-office or home chemical peels. This allows for targeted treatments but may require recovery time. By choosing between daily use of lower concentrations or periodic high-concentration peels, individuals can tailor their skincare routine to their needs and goals, balancing effectiveness with skin safety.

Conclusion:

This comprehensive review highlights the significant impact of face acids on skin health and aesthetics. Through an exploration of various types of acids, including alpha hydroxy acids (AHAs), beta hydroxy acids (BHAs), and polyhydroxy acids (PHAs), we have elucidated their mechanisms of action, benefits, and potential risks. The evidence suggests that when used appropriately, these acids can enhance skin texture, promote cell turnover, and address issues such as acne, hyperpigmentation, and signs of aging.

However, it is crucial for consumers to understand individual skin types and sensitivities to minimize adverse reactions. The integration of face acids into skincare routines should be approached with care, emphasizing the importance of gradual introduction and adequate sun protection. Future research is essential to further elucidate the long-term effects of these acids and to explore the synergies between different formulations.

Overall, the proper use of face acids can significantly contribute to healthier, more radiant skin, making them a valuable addition to modern skincare regimens.

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Biodegradable emulsifying agents for cosmetic preparations : A Review

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Abstract

Emulsions have been used for many centuries in various ways, including cosmetic decoration. Emulsification is one of the most useful tools in the cosmetic field. A considerable proportion of the most popular cosmetic items of today are emulsions.

Emulsifiers play a key role in cosmetic formulations as they bridge the gap between oil- and water- based ingredients. They help stabilize and blend these different components, resulting in the smooth and even texture we expect from our skin, hair and body care products. In recent years, demand for biodegradable emulsifying agents has increased as consumers increasingly seek products that meet their desire for more sustainable and environmentally friendly choices. It has been known that emulsifying agents have a negative environmental impact, therefore biodegradability has become a fundamental requirement, almost as much as functionality. Biodegradable emulsifying agents can break down into simpler, environmentally friendly substances. This property reduces the accumulation of persistent pollutants in ecosystems.

There are wide numbers of emulsifying agents available which can be used in emulsions in various concentrations whether alone or in combination with other emulsifying agents which may improve the stability of emulsions. The attention was focused on some of the biodegradable emulsifying agents used in the preparation of emulsions.

Keywords : Biodegradable, emulsifying agent, emulsion, cosmetic, stability.

Introduction

Emulsions have been used for centuries in various ways, including cosmetic decoration.[1] Emulsification is one of the most useful tools in the cosmetic field. Among other things, it promotes acceptability and "cosmetic elegance," allows otherwise impractical combinations of ingredients, favours the application of proper amounts, and (not least) combines these actions with considerable economic advantage. A considerable proportion of the most popular cosmetic items of today are emulsions.[2] Emulsions are colloidal dispersions of a liquid in another immiscible liquid stabilized using a surfactant and/or solid particles. Emulsions are of great importance due to their widespread occurrence in industries such as pharmaceuticals, cosmetics, food, agriculture, and energy. In the cosmetic industry, emulsions represent one of the most common media characterized by two-phase systems that are highly versatile and find widespread use in colour cosmetics, skincare, and personal care.[3]

When two immiscible liquids are in contact, there exists the separating surface or interface, a tension or force that retards the dispersion of one liquid in the other, and the liquids are accordingly said to be immiscible. Vigorous shaking may break one liquid into globules that become distributed throughout the other. This condition is only temporary as separation quickly takes place on standing. For example, castor oil and water are immiscible but when shaken together, small globules of the oil become

temporarily dispersed in the water. The oil is then the disperse phase and the water, which is continuous around the oil, is the continuous phase or dispersion medium.

If a third substance is added it may concentrate as a film at the interface. Consequently, the globules of dispersed liquid may remain indefinitely distributed in the other liquid instead of coalescing to form a separate layer. A substance that can promote dispersion in this manner is called an emulsifying agent, emulgent or emulsifier. The product is an emulsion. [4]

Emulsions are the most common type of delivery system used for cosmetic products. They enable a wide variety of ingredients to be quickly and conveniently delivered to hair and skin.[5]

Types of Emulsions

Emulsions are of two types:

1. Oil in water (o/w)
2. Water in oil (w/o)**Water-in-Oil Emulsion**

An emulsion is called a water-in-oil if the dispersed phase (internal phase) is water and the continuous phase (dispersion medium) is oil.

Oil-in-Water Emulsion

An emulsion is called oil-in-water if the dispersed phase (internal phase) is oil and the continuous phase (dispersion medium) is an aqueous base.[6] They may be liquid or semi-solid. [3]

In addition to these two types of simple emulsions, more complex systems also exist.[7] Depending upon the globule size, emulsions are empirically classified. These are as follows:[8]

Microemulsions

Clear dispersion of oil in water or water in oil is referred to as microemulsions. Microemulsions can be produced by emulgents which give a local negative interfacial tension and form monomolecular interfacial films. In such emulsions, the dispersed phase globules are exceedingly small ranging in diameter from 100°A to 600°A.[8] and the volume fraction of the dispersed phase varies from 0.2 to 0.8.[9]

Fine emulsions

Normally these have a milky appearance, and the globule size ranges from 0.25 to 25 μm.

Multiple emulsion or Complex emulsion [10]

Water-in-oil-in-water (w/o/w) emulsions, also known as multiple emulsions, may be prepared by blending a w/o emulsifier with an oil phase in a mixer and slowly adding the aqueous phase to form a water-in-oil emulsion. The w/o emulsion is then dispersed in an aqueous solution of an o/w emulsifying agent to form the final water-in-oil-in-water emulsion. An oil droplet enclosing a water globule may be dispersed in water to give a water-oil-water emulsion. Similarly, oil-water-oil systems are possible.[11]

Emulsifying Agents

Emulsifying agents are an essential part of the formulations since many cosmetic formulations are emulsions. Thousands of emulsifying agents are available on the world market today. Emulsifier choice is not only crucial for the stability of an emulsion but also has a significant impact on consistency and viscosity, skin feel, colour, odour, and care properties of the final formulation.[12] An emulsifier function is operationally defined as a stabilizer of the droplet form (globule) of the internal phase. Based on their structure, emulsifiers may be described as molecules comprising hydrophilic (oleophobic) and hydrophobic (oleophilic) portions. For this reason, this group of compounds is frequently called amphiphilic (i.e., water- and oil-loving).[13]

When the emulsifier is added to the emulsion systems, it migrates to the oil-water interface, the lipophilic part of the emulsifier molecule being oriented in the oil phase and the hydrophilic part being oriented in the water phase. This orientation of the emulsifier molecule at the oil-water interface is represented diagramatically in the figure.[14]

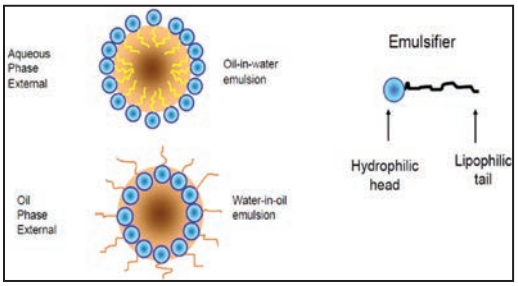


Figure 1: Structure of an emulsifying agent and types of emulsion [15]

Since emulsifying agents combine two dissimilar components, they tend to be wholly soluble in neither oil nor water; thus, they collect at the interface of the two phases. This collection reduces the interfacial tension between the two phases and promotes emulsification.

According to classic emulsion theory, emulsifying agents assist in the formation of emulsions by three mechanisms:

- Reduction of interfacial tension- thermo dynamic stabilization
- Formation of rigid interfacial film- mechanical barrier to coalescence. [15]
- Formation of an electrical double layer- electrical barrier to approach of particles. [16]

Desirable Properties

Some of the desirable properties of an emulsifying agent are that it should be:

- Be surface active and reduce surface tension to below 10 dyne/cm.
- Be absorbed quickly around the dispersed drops as a condensed, non-adherent film that will prevent coalescence.
- Impart the droplets with an adequate electrical potential so that mutual repulsion occurs.
- Increase the viscosity of the emulsion.
- Be effective in a reasonably low concentration. [17]
- Assist in building up of zeta potential. [18]

Types of Emulsifying Agents

Emulsifying agents are of two types-

1. Primary (true) emulsifying agents: These produce good emulsions.

2. Emulsion stabilizers (secondary emulsifying agents): Alone these produce coarse emulsions but when used with a primary emulsifying agent, the resulting emulsion has improved stability.

There are many emulsifying agents, but most belong to one of four groups:

i. Natural products: Acacia, tragacanth, beeswax, Woolfat, etc.

ii. Semi-synthetic polysaccharides: Methylcellulose, sodium carboxy methyl cellulose, etc.

iii. Surface active agents: Alkali metals, quaternary ammonium compounds, glycol and glycerol esters, Sorbitan esters, etc.

iv. Finely divided solids: Bentonite, veegum, etc. [19]

v. Auxiliary emulsifying agents: Saponins and carbomers. [20]

Emulsifiers play a key role in cosmetic formulations as they bridge the gap between oil and water- based ingredients. They help stabilize and blend these different components, resulting in the smooth and even texture we expect from our skin, hair, and body care products. In recent years, demand for biodegradable emulsifying agents has increased as consumers increasingly seek products that meet their desire for more sustainable and environmentally friendly choices. [21]

It has been known that emulsifying agents have a negative environmental impact, therefore biodegradability has become a fundamental requirement, almost as much as functionality.[22] Biodegradable emulsifying agents can break down into simpler, environmentally friendly

substances. This property reduces the accumulation of persistent pollutants in ecosystems.[21] There are wide numbers of emulsifying agents available which can be used in emulsions in various concentrations whether alone or in combination with other emulsifying agents which may improve the stability of emulsions. The attention was focused on some of the biodegradable emulsifying agents used in the preparation of cosmetic emulsions.

SORBITAN OLIVATE

Olive oil and its derivatives are extensively used in the preparation of many cosmetic applications. Sorbitan olivate is an olive oil derivative developed for dermatological formulation.

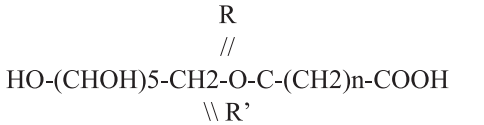
It is a natural ingredient obtained by combining sorbitol, a natural sugar alcohol, and fatty acids derived from olive oil. The resulting mixture undergoes a chemical reaction creating Sorbitan Olivate.

It is a non-ionic w/o emulsifying agent which is biodegradable, non-toxic, and non-irritant. It is used at a concentration of 5-10% with an oil phase of middle or low polarity (hydrocarbon esters or ethers) to obtain a stable emulsion.[23]

It is a versatile and effective ingredient used in a wide variety of cosmetic and personal care products. It appears as a waxy, light yellow to beige substance that is soluble in both oil and water. It creates a smooth, creamy texture and helps in stabilizing the formulation. It is also a moisturizer and helps to hydrate and soothe dry or irritated skin. The chemical formula of Sorbitan Olivate is $C_{24}H_{46}O_6$.

It is added to a variety of cosmetic products, including creams, lotions, and serums to create a smooth and creamy texture and also in lipsticks, eyeshadows, and foundations. It helps to improve the texture and spreadability of these formulations, creating a smooth and even application. [24]

Structure :



Structure 1: Sorbitan Olivate [25]

Technical Profile :

Property	Values
IUPAC Name	D-Glucitol, 1,4-Anhydro-, 6-monoester with olive oil fatty acid
Melting Point	64-70° C
pH	5.0-7.0
solubility	Soluble in water, oil
Viscosity	Low
Biodegradability	High

Safety profile:

Sorbitan olivate is considered safe for use in cosmetics and personal care products as it is non-toxic and non-irritating to the skin and hair. There have been no reported side effects associated with Sorbitan Olivate use. A patch test is not typically necessary, but it is recommended for individuals with very sensitive skin. It is not comedogenic, which means it will not clog pores. It is a vegan ingredient and is also considered halal. [25]

Products with Sorbitan Olivate [26]

- Pistache Pistachio Body Butter
- Image Vital C Hydrating Facial Cleanser
- Milk Makeup Flex Concealer and many more…

POTASSIUM CETYL PHOSPHATE

It is a whitish powder that is considered the gold standard in emulsifiers for difficult-to-stabilize emulsions.Potassium cetyl phosphate is obtained by mixing phosphoric acid esters and cetyl alcohol with potassium. As an emulsifier, it

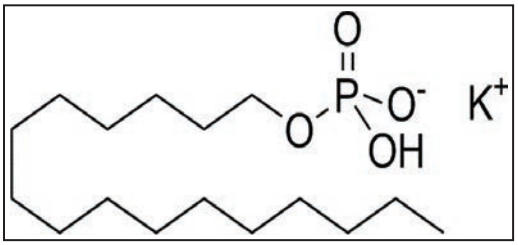
improves product consistency to enable even distribution on the skin. [27]

The typical product use level for Potassium cetyl Phosphate in cosmetic formulations ranges from 0.5- 5%.[28] It is a highly effective oil-in-water anionic o/w emulsifier. It has good stability with a broad variety of oil blends and UV filters. It even helps to boost the Sun Protection Factor (SPF) of UV filters. Potassium Cetyl Phosphate is especially suitable for the manufacturing of stable water-resistant sunscreen formulations with a good spread-ability and pleasant skin feel.

Potassium Cetyl Phosphate is easy to handle as it is soluble in hot water. It comes in a neutralized form which means it is ready to use and it gives fast, predictable viscosity. This product is pre-neutralised to the potassium salt, which is important to rapidly and reproducibly obtain the desired viscosity of the emulsion.[29]

Potassium cetyl phosphate in cosmetics is found in numerous products like creams, shower gels, facial cleansers, shampoos, sunscreens, makeup removers, etc. It is non-irritating to the skin. It is popular in sunscreens as it can boost SPF protection and increase the water resistance of the formula.[27] Its chemical formula is $C_{16}H_{34}KO_4P$.

Structure :



Structure 2: Potassium cetyl phosphate [30]

Safety profile:

The Cosmetic Ingredient Review (CIR) Expert Panel has reviewed Potassium cetyl phosphate as safe to use in cosmetics, but it can irritate sensitive skin.[27]

Technical Profile :

Property	Values
IUPAC Name	Potassium; hexadecyl hydrogen phosphate
Melting Point	161-166° C
pH	6.5-8.5
solubility	Partially soluble in water
Biodegradability	High

Products with Potassium cetyl phosphate: [31]

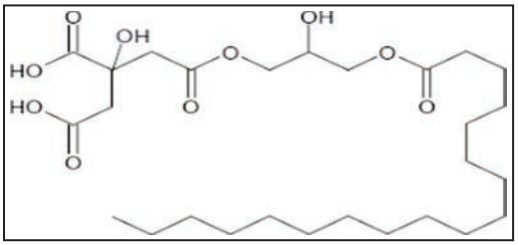
- L'Oréal Paris True Match Nude Tinted Serum
- Revolution Superdewy Tinted Moisturiser
- Avon care gel-cream facial hydratante and many more….

GLYCERYL STEARATE CITRATE

Glyceryl Stearate Citrate is a hydrating ingredient derived from vegetable oils that is used in many cosmetic and personal care products. Glyceryl Stearate is made by reacting stearic acid and glycerine. Whereas, Glyceryl Stearate Citrate has an added citric acid molecule. This waxy ingredient is white to pale yellow in its raw form.[32] Its concentration can vary depending on the specific product and formulation, but it is generally used at concentrations between 1-5%. [33]

Depending on the manufacturing process of the formulation, this ingredient can serve several functions. It is a good cleansing agent that can mix well with oil and dirt to leave the surface clean. Further, Glyceryl Stearate Citrate is also an emulsifier. The chemical formula of Glyceryl Stearate Citrate is $C_{27}H_{48}O_{10}$.[32]

Structure :



Structure 3: Glyceryl Stearate Citrate [34]

Technical Profile :

Property	Values
IUPAC Name	1,2,3-Propanetricarboxylic acid, 2- hydroxy-, ester with 1,2,3-propanetriol mono octadecenoate
Melting Point	80° C
Boiling Point	650.8° C
pH	5.5-8.0
solubility	Insoluble in water
Biodegradability	High

Safety profile:

Glyceryl Stearate Citrate is safe and good for the skin. It works for all skin types and does not have any common side effects such as skin sensitization or irritation. However, Glyceryl Stearate Citrate can be mildly comedogenic and cause acne on highly sensitive skin. A patch test can be done beforefull application for added precautions. Additionally, Glyceryl Stearate Citrate derived from plant-based sources is vegan and halal. [32]

Products with Glyceryl Stearate Citrate: [35]

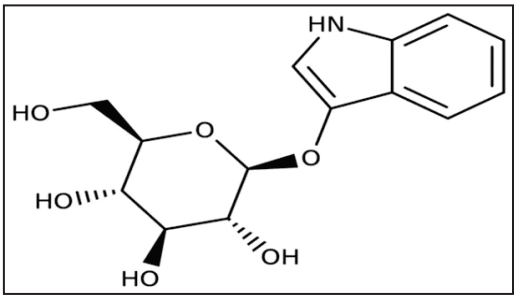
- Revolution rehab Face lift Face Rolling Serum
- Korres Castanea Arcadia Anti-wrinkle and Firming Night Cream
- Oriflame Love Nature Mattifying Face Lotion and many more…

CETEARYL GLUCOSIDE

Cetearyl Glucoside is one of the most efficiently used natural emulsifiers. With its low requirement of up to only 1.5% in creams and lotions the oil phase is freed up for the addition of more emollients and actives giving you more control and optimal label appeal. [36]

Cetearyl Glucoside can be both natural and synthetic. It is commonly made by reacting Cetearyl alcohol with glucose. Cetearyl Glucoside is an emulsifier that has softening properties for the skin and improves the texture of the formulations to which it is added. It is good for low-viscosity formulations and enhances the spreadability of cosmetic and personal care products. In its raw form, Cetearyl Glucoside appears as pellets that are ivory in colour. It also has a characteristic odour. Further, the chemical formula of Cetearyl Glucoside is $C_{22}H_{30}N_4O$.[37]

Structure :



Structure 4: Cetearyl Glucoside [38]

Technical Profile :

Property	Values
IUPAC Name	D-Glucopyranose, C16-18 alkyl glycosides
Melting Point	141-145°C
solubility	Soluble in water
Biodegradability	High

Safety profile:

Cetearyl Glucoside is safe for the skin when used under the recommended use levels, which is around 1-1.5%. Using Cetearyl Glucoside higher than 3% can cause side effects such as burning and itchiness. Further, this ingredient can be slightly comedogenic and may cause acne. A patch test should be performed before the full application. Cetearyl Glucoside is also safe for use during pregnancy.

Products with Cetearyl Glucoside:

- Whitening essence By SOHO ANECO Chemicals
- Repairing Hand cream by Minasolve
- M Face Mask by ICL Industrial [37]

CETEARYL GLUCOSIDE AND CETEARYLALCOHOL

Cetearyl Glucoside & Cetearyl Alcohol is a natural self-emulsifying cream base, that demonstrates good skin compatibility, even with sensitive skin.

Cetearyl Glucoside and Cetearyl Alcohol is a natural white to pale yellow flaky pallet, non-ionic o⁄w emulsifier extracted primarily from corn (ChemSpider, 1841) and coconut using eco-friendlyprinciples, without the use of chemicals or solvents. This ensures a stable emulsion of oil-based and water-based ingredients and is both mild and non-irritating.

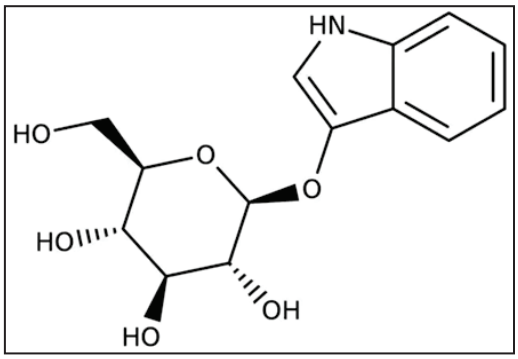
The chemical formula of Cetearyl Glucoside is $C_{22}H_{30}N_4O^{37}$ and that of Cetearyl alcohol is $C^{39}{}_{34}H_{72}O_2$.

It is a standalone emulsifier that smooths the consistency of a cream and It helps skin and hair retain natural moisture while imparting a velvety after touch.[40]

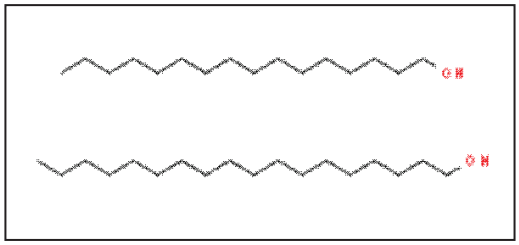
It can be used in the range between ^{3}-^{100}%. It promotes liquid crystal structure for optimal skin- friendly applications. It helps to hydrate and moisturize the skin due to a reduction in TEWL ... the goal of any premium cosmetic.[36]

It is widely used and can be used to prepare a variety of creams and lotions, especially for preparing sunscreen products, which can improve the product's SPF and water resistance. It has excellent emulsifying properties, regardless of molecular weight and polarities.[41]

Structure :



Structure 4: Cetearyl Glucoside[38]



Structure 5: Cetearyl Alcohol [41]

Technical Profile :[42]

Property	Values
IUPAC Name	Cetearyl Glucoside (and) Cetearyl Alcohol
Melting Point	60 – 65°C
pH	4.0 – 7.0
solubility	Soluble in water
Biodegradability	High

Safety profile:

Excellent skin compatibility, non-irritating, and can reduce the irritation of other raw materials for the preparation of baby supplies and high-end

skincare products.[40]

It is approved by COSMOS, NATRUE, and ECOCERT.[39]

Conclusion :

It is widely recognized that emulsifying agents carry a detrimental environmental impact. Consequently, biodegradability has emerged as a critical and fundamental criterion, nearly on par with functionality. Indeed, the biodegradable emulsifying agents exhibit a remarkable ability to decompose into environmentally friendly compounds. This crucial property significantly mitigates the build-up of persistent pollutants within the ecosystem. Given the current environmental conditions, the adoption of biodegradable emulsifying agents has become imperative. These agents not only serve their functional purpose but also contribute to a greener and more sustainable approach.

Moreover, Biodegradable emulsifiers can match or even surpass traditional emulsifying agents in performance. They enhance stability, dispersion, and solubilization properties. Biodegradable emulsifiers tend to be less toxic compared to their non-biodegradable counterparts, reducing potential health risks and proving effective even at low concentrations. Additionally, they assist companies in achieving sustainability goals and adhering to regulations that favor eco-friendly ingredients.

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Effects of stress on eating behaviors of college going students

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Abstract

College life is a time of significant transition and change, often accompanied by heightened levels of stress. This stress can have a profound impact on various aspects of students' lives, including their eating behaviors. The purpose of this study was to examine the effects of stress on the eating behaviors of college students, with a focus on how stress influences food choices, appetite regulation, and overall dietary habits.

The impact of stress on eating behaviors extends beyond immediate food choices. Chronic stress can disrupt the body's natural appetite-regulating hormones, leading to long-term changes in appetite and metabolism. This can contribute to weight gain, obesity, and a range of related health issues, including diabetes, cardiovascular disease, and mental health disorders.

In addition to its physiological effects, stress can also influence eating behaviors through psychological mechanisms. Stress can trigger feelings of anxiety, depression, or low self-esteem, which may in turn affect food choices and eating habits. Overall, the findings of this study highlight the complex relationship between stress and eating behaviors among college students.

INTRODUCTION

In today's fast-paced and competitive world, college life has become synonymous with stress for many students. The pressure to excel academically, the challenges of transitioning to adulthood, and the demands of social and personal life can all contribute to heightened stress levels among college-goers. One significant yet often overlooked aspect of this stress is its impact on eating behaviors. This paper aims to explore the effects of stress on the eating behaviors of college students, examining how stress can lead to changes in food preferences, eating habits, and overall health.

College life represents a crucial period of transition from adolescence to adulthood, marked by a multitude of changes and challenges. Students grapple with academic pressures, the new college environment, peer influences, separation from family, social expectations, and personal ambitions, all of which can evoke a range of emotions including stress, loneliness, and self-doubt. Amidst these changes, their dietary habits and eating behavior may also undergo significant transformations.

Stress is a natural response to challenging or threatening situations. It triggers a cascade of physiological responses, including the release of stress hormones such as cortisol and adrenaline, which prepare the body for a fight response. While stress can be beneficial in short bursts, chronic stress can have detrimental effects on both physical and mental health which also in turn affects the eating behaviors.[1]

One of the most noticeable effects of stress on college students is its impact on eating behaviors. Stress can lead to changes in appetite, food choices, and eating habits, which can have long-term implications for health and well-being.

Eating behavior again is a complex interplay of physiological, psychological, social, and genetic factors, shaping meal timings, food quantity as well as quality and preferences. Early life experiences, particularly during infancy and early childhood, play a vital role in the development of eating habits. Many college students, especially those living away from home, often resort to convenient and unhealthy food options that are easily and readily available,

like packaged foods and fast food, which are typically high in simple carbohydrates, fats and sodium, and low in essential nutrients that are necessary for the body.[2]

Emotional state is another key determinant of eating behavior, with the transition to college or university life often triggering stress among students. Studies have shown a link between emotional states like stress, body dissatisfaction, loneliness, and eating behaviors. The effects of stress-induced changes in eating behaviors extend beyond mere dietary choices. Poor eating habits can contribute to weight gain, obesity, and a host of related health issues, including diabetes, cardiovascular disease, and mental health disorders such as depression and anxiety.[3]

This transformative phase in student's life's is characterized by a lot of changes, ranging from academic pressures and the new college environment to peer influences, separation from family, etc.

PURPOSE OF STUDY

The purpose of this study is to understand the effects of stress on eating behaviors among college students which is significant and multifaceted. It is essential for college students to adopt healthy overcoming mechanisms and stress management strategies to mitigate the negative effects of stress on their eating behaviors and overall health. To understand the complex interplay of factors influencing eating behavior during this transformative phase in every student's life and to promote healthy eating habits and overall well-being among college students.

AIM

To study the effect of stress on eating behaviors of students.

OBJECTIVES:

1.To study the factors influencing stress-induced eating behaviours in students.

2.To study the relationship between stress and eating behaviours among college students.

3.To study the patterns of stress-related eating behaviours in students.

4.To propose interventions to promote healthy eating habits and stress management among college students.

LIMITATIONS:

1. Imposition of age restriction, that is 18-25 only.

2. Time constraint, which restricted the depth and scope of data collection and analysis.

RESEARCH METHODOLOGY

1.**Area selection**:

This cross-sectional study was conducted throughout India to collect information from diferrent parts of country.

2.**Sample selection**:

Random sampling method was adopted in the age group of 18 to 25 and the sample size was 51.

3. Data collection:

- Primary data:- The primary data was collected by designing a questionnaire in goggle forms and was sent to respondents via email and through their contact numbers.
- Secondary data:- Secondary data was collected through books, journals, websites, magazines.

4.Data analysis: - The data collected was analyzed carefully and interpreted using statistical tools like google analysis, percentages, tables and pie charts.

RESULTS & DISCUSSIONS:- The data collected on " Effects Of Stress On Eating Behaviour Of Students" is being interpreted as follows.

The age group of the participants ranged from 18 to19 years is 13.72%, the average age ranged between 20 to 21 years is 15.68%, the age group of 22-23 consists of 23.53% and the age group of 24-25 years consists of 47.05%.

Table No. 1
Average Age of Students studying in College

Sr. No.	Age of respondents	Responses	Percentage (%)
1.	18-19	7	13.72
2.	20-21	8	15.68
3.	22-23	12	23.53
4.	24-25	24	47.05

Table No. 2
Average weight of students across India

Sr. No.	Weight of respondents in kgs	No. of Responses	Percentage (%)
1.	47-56	9	17.65
2.	56-65	9	17.65
3.	71-79	12	23.52
4.	79-88	7	13.72
5.	88-96	5	9.80
6.	96-106	4	7.84

From the above table it is been cleared that 17.65% of students falls in the range of average weight of 47-65, whereas 23.52% of students have weight in the range of 71-79kgs, 13.72% of students have weight in the range of 79-88kgs, 9.80% of students falls in the average range of 88-96 kgs and only 7.84% of students are overweight.

Table NO.3
Place where you are residing in India.

Sr. No.	Place where students are residing in India	Responses	Percentage (%)
1.	Maharashtra	27	52.94
2.	Uttarakhand	13	25.49
3.	Delhi	7	13.72
4.	Karnataka	3	5.88
5.	Andra Pradesh	1	1.96

Nearly 53% of the participants are from Maharashtra, followed by approx 26% from Uttarakhand, 13% from Delhi, approx 6% belongs to Karnataka and only 1% of the students respondents belongs to Andra Pradesh.

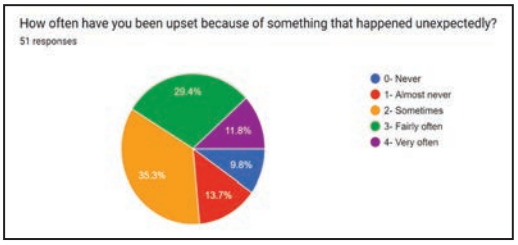
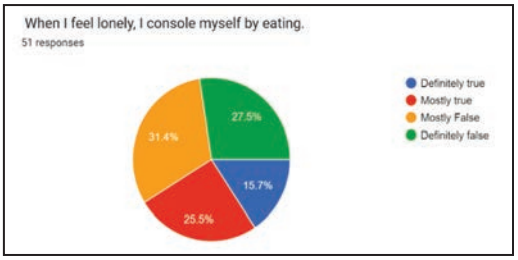


Fig. No 1 indicates the percentage of being Upset when something unexpectedly happens to them. It is being observed that nearly 29.4% of students feel upset if something unusual happens to them. Whereas 35.3% of students feels upset sometimes only and surprisingly 9.8% of students are never being upset even if something unusual happens to them.



To understand the Emotional eating (EE) behaviour, it was found that 31.40%participants experienced Emotional eating behaviors, and more than 42% participants used food as medium to distract themselves when they were lonely.

SUMMARY AND CONCLUSION

In conclusion, stress can have a profound impact on the eating behaviors of college students, leading to increased consumption of high-fat and high-sugar foods, as well as emotional eating. These changes can have negative implications for students' health and well-being. By understanding the relationship between stress

and eating behaviors, educators, healthcare providers, and policymakers can develop effective interventions to promote healthy eating habits among college students.

Several factors contribute to the relationship between stress and eating behaviors. Physiologically, stress triggers the release of hormones such as cortisol and ghrelin, which can increase appetite and promote the consumption of unhealthy foods. Psychologically, stress can lead to feelings of anxiety, depression, and low self-esteem, which may drive individuals to use food as a coping mechanism.

Social and environmental factors also play a role. College environments are often characterized by easy access to unhealthy foods, such as fast food and snacks, which can contribute to poor eating habits. Additionally, the demands of academic life, social pressures, and financial concerns can all contribute to stress levels and impact eating behaviors.

The consequences of stress-related eating behaviors can be significant. Chronic stress and unhealthy eating habits have been linked to an increased risk of obesity, metabolic disorders, and cardiovascular disease. Moreover, the cycle of stress and unhealthy eating behaviors can contribute to feelings of guilt, shame, and poor self-image, further exacerbating the problem.

Addressing the effects of stress on eating behaviors requires a multifaceted approach. Interventions should focus on stress management techniques, such as mindfulness meditation, yoga, or cognitive-behavioral therapy, to help students develop more adaptive coping strategies. Additionally, promoting healthy eating habits, providing access to nutritious food options on campus, and raising awareness about the impact of stress on eating behaviors are crucial steps in mitigating the negative effects of stress on student health.

Overall, understanding the effects of stress on eating behaviors is essential for promoting the health and well-being of students.

Recommendations

To promote healthy eating habits among college students, it is essential to implement interventions that address the underlying causes of stress-related eating behaviors. This may include providing students with access to healthy food options on campus, promoting stress management techniques such as mindfulness and relaxation techniques, and educating students about the link between stress and eating behaviors.

Given the detrimental effects of stress on eating behaviors, it is important to implement interventions to help college students manage stress in a healthy way. This may include stress management techniques, yoga, or cognitive-behavioral therapy, which can help students develop more adaptive coping strategies and raising awareness about the impact of stress on eating behaviors can help mitigate the negative effects of stress on student health.

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Artificial Intelligence in Dermatology; Advances in Skin Cancer Diagnosis : A Review

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Abstract

One of the most significant global health concerns is still skin cancer. Skin cancer is curable with successful treatment if detected early. Although early detection is critical to successful cancer treatment, the current approach necessitates the involvement of skin cancer specialists, making it a costly operation that is difficult to access and inexpensive in developing nations. Primary care physicians (PCPs) may lack expertise in diagnosing skin cancer when patients arrive with worrisome lesions. As the global use of smartphones grows, mobile applications (apps) have emerged as an effective tool for healthcare involvement. Dermatology apps powered by Artificial Intelligence (AI) are prominent among them, as they give quick diagnostic guidance and educational materials for skin illnesses such as skin cancer. Furthermore, federated learning and multi-party privacy computing, two cutting-edge AI technologies, can significantly reduce patient privacy issues in dermatological datasets and accelerate the transition to high-precision self-diagnosis.

Keywords: artificial intelligence, dermatology, skin cancer.

Introduction:

Unnatural skin cell proliferation is called skin cancer. Although the study focuses on epidermal skin cancer, malignant growths can affect both the dermis and the epidermis. Carcinomas and melanomas are the two forms of skin cancers that can emerge from the epidermis, depending on the type of cell involved (keratinocytes or melanocytes). Due to several factors, including the fact that there are several subtypes of skin cancer, it is difficult to quantify the incidence of acne. One may never pinpoint the exact cause of skin cancer, although factors such as exposure to UV radiation, weakened immune systems, and family history are among the possibilities. Estimating the incidence of skin cancer is challenging due to its different sub-types [1- 8].

Skin cancer is the most prevalent type of cancer identified in the US, although its clinical diagnosis can be challenging for primary care physicians (PCPs) who typically see early presentations. Skin cancer rates, including malignant melanoma (MM) and keratinocyte carcinoma, have climbed by 44% and 77%, respectively, in recent decades. Early detection is key to a cure for skin cancer, with a 99% 5-year survival rate for MM when identified locally. However, this figure decreases to 66% for regional and 27% for distant stages. There is a critical need to enhance early detection of skin cancer to increase survival rates and reduce morbidity and associated healthcare expenditures [9- 12].

New optical technology methods have considerably improved non-invasive skin cancer diagnosis accuracy. Educational interventions, dermoscopy, reflectance confocal microscopy, optical coherence tomography, multiphoton excited fluorescence imaging, and others [13-15].

Machine learning advances have resulted in AI-based computer algorithms that match or exceed diagnostic imaging specialists' results. AI-based diagnostic solutions have numerous benefits, including increased availability and access to expert information. Retrospective studies on skin cancer diagnosis have consistently shown that AI outperforms humans. The largest study, the International Skin Imaging Collaboration (ISIC) 2018 Challenge, pitted 511 doctors to 139

computer methods [16].

There is mounting evidence that artificial intelligence is a beneficial supplemental tool in a variety of medical fields (including radiology and dermatology). New technology, such as convolutional neural networks (CNNs), allows for the automatic diagnosis of skin diseases using images in vitro. Skin cancer identification networks often classify high-quality photos. However, in a realistic scenario, a wide range of image quality and attributes must be considered. A recent meta-analysis revealed unstable performance for smartphone-based applications; the application with the greatest performance had a sensitivity of 80% and specificity of 78% [17- 19].

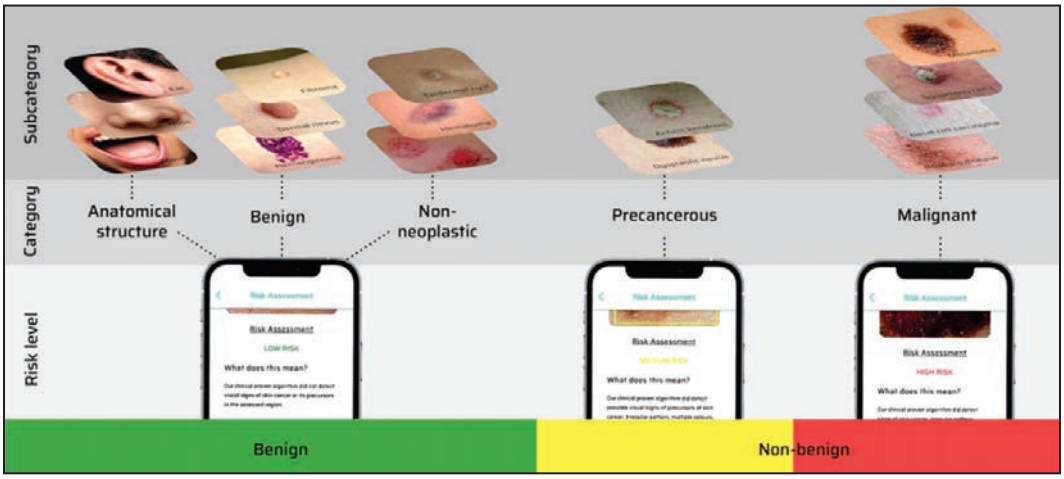

Fig 1. Graphical depiction of the "three-level decision tree.

Artificial intelligence in dermoscopy images:

Dermoscopy is the examination of skin lesions with a dermatoscope, which consists of a high-quality magnifying lens and a (polarizable) lighting system. Dermoscopic photos are taken with high-resolution DSLR or smartphone camera attachments. The use of dermoscopic images for AI algorithms has become a very popular study subject since the advent of numerous huge publically available dermoscopic datasets containing various forms of benign and malignant skin lesions, as shown in Figure 2. [20]

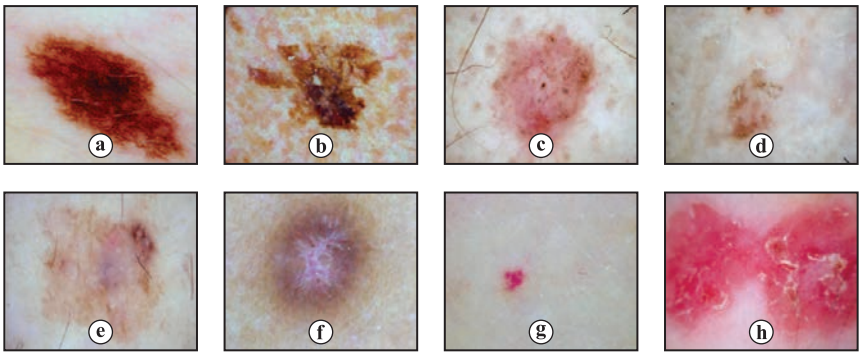

Fig. 2. Illustration of different types of dermoscopic skin lesions where (a) Nevus (b) Melanoma (c) Basal Cell Carcinoma (d) Actinic Keratosis (e) Benign Keratosis (f) Dermatofibroma (g) Vascular Lesion (h) Squamous Cell Carcinoma [21]

The ground truth for lesion diagnosis:

Histopathology is the primary method for diagnosing melanoma. However, histological diagnostic labels for atypical melanocytic lesions vary greatly across and between observers. The diagnosis variability raises whether a convolutional neural network (CNN) is learned from the correct data set. Consensus diagnosis, if feasible, could alleviate this issue. Molecular biomarkers can aid in diagnostics and identifying high-risk biology and are thoroughly validated before clinical application. Pathologists and physicians use metadata, such as age, personal and family history, lesion symptoms, and recent changes, to determine diagnostic likelihood. Various data formats, including metadata, sequential picture data, and histopathology, can be used to train CNN algorithms and improve diagnostic discrimination [22- 25].

Perception of the use of Artificial Intelligence in the diagnosis of Skin Cancer:

Introducing artificial intelligence at various stages of health care has both advantages and downsides. Using an AI system as a triage tool before physician assessment allows for automated risk categorization of individuals and/or lesions. When the research is examined, an agreement emerges on the necessity of accessibility and availability of systems and applications for skin lesion detection and classification. Nonetheless, many systems fail to fully meet these objectives due to budget constraints, technical complexity, or a lack of clear rules. To overcome this issue, companies, accessibility experts, programmers, and users work together to translate intentions into action. Such a coordinated endeavor will yield tremendous benefits to all parties involved. Finally, AI applications are to be designed and evaluated ethically and responsibly. This includes guaranteeing patient data privacy and security, as well as transparency in algorithm creation and training [22, 26].

Safe implementation of new technologies in the diagnosis of skin cancer:

Dermatologists and general practitioners believe that using AI in skin cancer care can improve patient outcomes in both primary and secondary care. Using AI for skin cancer detection by dermatologists and GPs improves diagnosis accuracy, reducing missed diagnoses and wasteful biopsies and excisions of benign skin lesions.

As a result of the higher detection accuracy, GPs stated that they expect to feel more confident when using AI to address suspected skin lesions.

The Therapeutic Goods Administration (TGA) aims to streamline the approval process for new devices in Australia, enhance monitoring and follow-up, and give consumers more information about their devices. Consumers and professionals must understand the intended usage of an application or device. Smartphone apps offer a variety of features, including education, monitoring, and classification of skin lesions [27].

Discussion:

As the application of AI may result in more exact, unbiased, and faster diagnoses, experts believe that AI-driven technology will be adopted in the medical profession shortly, particularly in skin cancer diagnostics. A lack of acceptability by patients and clinicians would have significantly hampered this progress. AI/ML systems have the potential to help doctors accurately detect skin lesions in primary care settings. It is great to see an increasing number of studies addressing implementation aspects and challenges, such as the use of AI/ML to help doctors accurately identify skin lesions. The use of AI/ML algorithms to assist primary care practitioners in the triage of worrisome skin lesions may represent the best application of these technologies in primary care clinical settings. Harmonization of regulatory standards around the world will be critical to the widespread adoption of AI systems in healthcare.

Conclusion:

AI in skincare represents a significant move toward tailored, data-driven solutions that benefit both customers and healthcare providers. It has the potential to revolutionize how we approach skin health by providing exact diagnosis, personalized treatments, and new product development. Addressing issues of data privacy, prejudice, and human oversight will be important to ensuring AI reaches its full potential in the skincare industry. The use of artificial intelligence in skin cancer diagnostics is a significant leap in dermatology, with the potential to improve outcomes, lower healthcare costs, and increase access to early detection. Attention to ethical, regulatory, and practical problems will be required to fully incorporate AI into clinical practice in a way that optimizes its benefits while avoiding its drawbacks. In the future, AI is anticipated to become a critical weapon in dermatologists' arsenals, augmenting human skills and revolutionizing worldwide skin cancer management.

Acknowledgement:

We are grateful to the broader academic community and the numerous researchers whose work in the field of AI and skin cancer diagnosis has provided the foundation upon which this review is built.

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A Review on the Role of Bicelle Beads in Modern Cosmetic Formulations

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Abstract

Nanocarriers have become crucial in the cosmetic industry, enhancing the delivery, stability, and effectiveness of active ingredients in various formulations. Technologies like liposomes, niosomes, microspheres, and microsponges have been widely adopted for their ability to improve bioavailability and ensure targeted delivery to the skin. Among these, one of the latest additions is bicelle beads, a unique type of nanocarrier characterized by a disc-like structure composed of lipid bilayers. Bicelle beads are capable of encapsulating both hydrophilic and hydrophobic compounds, which makes them versatile in cosmetic applications. This review explores the role of bicelle beads in modern cosmetic formulations, examining their potential to deliver active ingredients efficiently, provide stability, and offer enhanced penetration into the skin.

Keywords: Bicelle beads, cosmetics, active ingredients, nanocarriers, lipid bilayers.

Introduction:

The use of nanocarriers in cosmetic formulations has introduced a new era of enhanced efficacy and targeted delivery of active ingredients. Liposomes, niosomes, nanospheres, solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), nanosponges, and ethosomes are some of the well-known nanocarriers that have been successfully integrated into a wide range of cosmetic products. These technologies improve the stability of active compounds, enhance their bioavailability, and enable controlled release, making them indispensable in modern skincare and cosmetic formulations. [2]

Among these innovations, bicelle beads have recently garnered significant interest due to their ability to enhance the delivery and stability of active ingredients. Bicelle beads are nanoscale lipid structures composed of a blend of long-chain phospholipids and short-chain lipids or detergents. This unique composition allows them to form disc-shaped particles that can integrate seamlessly with the skin's natural lipid layers. [3]

The potential of bicelle beads lies in their structural mimicry of cell membranes, which facilitates deeper penetration of active compounds into the skin. This property makes them suitable for various cosmetic applications, including moisturizing formulations, anti-aging treatments, and products designed for sensitive skin. As consumers increasingly demand products that offer both immediate and long-term benefits, the role of bicelle beads in delivering these outcomes becomes ever more critical. [2,4]

Structural Properties and Composition

Bicelle beads are composed of a combination of long-chain phospholipids, such as dimyristoylphosphatidylcholine (DMPC), and short-chain lipids or detergents, like dihexanoylphosphatidylcholine (DHPC). This combination results in a disc-shaped structure with a bilayer core and detergent-stabilized edges. The unique architecture of bicelle beads allows them to mimic natural cell membranes, making them highly effective in encapsulating and delivering active ingredients. [4]

The structure of bicelle beads can be fine-tuned by adjusting the ratio of long-chain to short-chain lipids. This ratio, along with temperature and pH conditions, influences the size, shape, and stability of the bicelles. Bicelle beads can range in size from 10-100 nanometers, and their

stability can be enhanced by incorporating cholesterol or other stabilizing agents. [5]

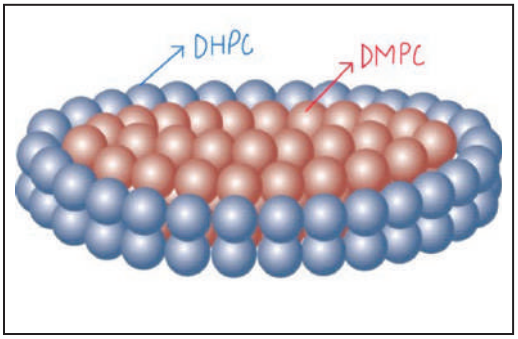

Fig. 1 Structure of Bicelle

Table no.1: Comparative Analysis of Size Ranges for Various Nano-Carriers [6]

Sr. No.	Nanocarriers	Size range
1.	Liposomes	25- 2000 nm
2.	Niosomes	100-1000 nm
3.	Nanospheres	1-200 nm
4.	Nanosponges	Less than 1000 nm
5.	Bicelle beads	10-100 nm
6.	Nanoemulsions	50-200 nm
7.	Solid lipid nanoparticles	50-1000 nm
8.	Nanostructured lipid carriers	10-1000 nm
9.	Hydrogels	10-100 nm

Mechanism of Action:

Bicelle beads enhance the delivery of active ingredients by facilitating deeper penetration into the skin. Their lipid bilayer structure is similar to the skin's natural barrier, allowing for better integration and absorption. Additionally, the presence of both hydrophilic and hydrophobic regions in bicelle beads enables the encapsulation of a wide range of cosmetic ingredients, including those that are not easily soluble in water. [5]

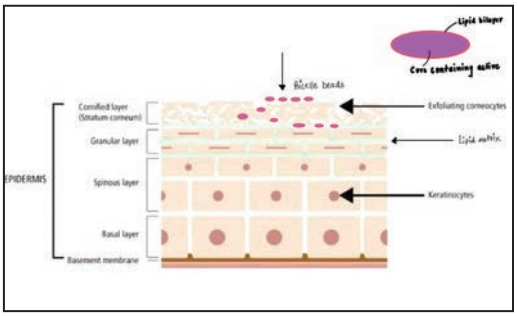

Fig. 2 Penetration of Bicelle Beads into Skin

When applied to the skin, bicelle beads interact with the stratum corneum, the outermost layer of the skin, facilitating the release and absorption of encapsulated active ingredients. The lipid bilayer of the bicelle beads merges with the lipid matrix of the stratum corneum, enhancing the penetration of active compounds. This results in improved bioavailability and efficacy of the active ingredients. [4]

Applications:

- Moisturizers: Enhances hydration and improves the stability of moisturizing ingredients.
- Anti-aging Treatments: Facilitates deep penetration of anti-aging actives, improving efficacy.
- Sensitive Skin Formulations: Provides gentle delivery of ingredients, reducing irritation and improving skin compatibility.
- Sunscreens: Enhances UV protection by ensuring even distribution and stability of UV filters.
- Whitening and Brightening Products: Reduces pigmentation by delivering brightening agents effectively.
- Acne Treatments: Improves penetration and stability of acne-fighting ingredients.
- Hair Care Products: Nourishes the scalp and hair shaft, enhancing the health and appearance of hair.
- Makeup Formulations: Enhances texture,

longevity, and delivery of beneficial ingredients, improving overall makeup performance. [7,9]

Advantages

1.Bicelle beads are smaller than regular liposomes due to the presence of DHPC molecules, which stabilize the edges, allowing for better size control and enhanced application in skincare.

2.The Bicelle structures, formed by long alkyl chain phospholipids and DHPC, produce reasonably monodisperse unilamellar vesicles that are thermodynamically stable, ensuring consistent and effective delivery of active ingredients.

3. Unlike surfactants that can damage the skin barrier, the phospholipid-based Bicelle beads maintain the integrity of the skin's lipid structures while delivering active compounds effectively.[8]

Challenges

1. Bicelle beads undergo a phase transition that causes them to change from small aggregates (15-20 nm) to larger structures (>500 nm) under physiological skin temperature (37°C). This transition may limit their ability to penetrate into the stratum corneum and thus reduce their effectiveness.[8]

2.Developing stable bicelle formulations requires precise control over lipid ratios and environmental conditions. [5]

3.The production of bicelle beads can be more expensive compared to traditional delivery systems.[5]

Discussion

Bicelle beads offer a few distinctive features that set them apart from other nanocarrier technologies like liposomes and niosomes. One of the primary distinguishing factors is their unique disc shape. This shape is critical because it helps prevent agglomeration, leading to enhanced stability and more uniform distribution within formulations. The disc shape also allows for a higher surface area-to-volume ratio, which can improve the interaction with skin cells and enhance the delivery efficiency of active ingredients. [2,8]

Nanocarriers such as liposomes and niosomes also offer controlled release and deep penetration, the specific architecture of bicelle beads can contribute to more consistent performance and longevity of the active ingredients in the product formulations. The structural stability provided by bicelle beads is complemented by their ability to incorporate a wide range of hydrophilic and hydrophobic compounds, making them versatile for various cosmetic applications. Also, bicelles can penetrate deeper into the narrow intercellular spaces of the stratum corneum than liposomes because of their smaller size. [10]

Additionally, the composition of these beads can be finely tuned to optimize their function. The combination of phospholipids and detergents used in their formation can be adjusted to enhance specific properties, such as skin permeability or bioavailability of the active compounds. [5]

Conclusion:

Bicelle beads represent a promising technology in the field of cosmetic formulations, offering enhanced stability, deep penetration, and efficient delivery of active ingredients. Their unique disc-like shape provides a distinct advantage by preventing agglomeration and improving structural integrity. The customizable nature of bicelle beads allows for tailored formulations to meet specific cosmetic needs, making them versatile in applications ranging from moisturizers to anti-aging treatments and sunscreens.

However, despite their benefits, there are challenges associated with bicelle bead formulations, such as the complexity of their preparation and potential cost implications. Further research and development are needed to optimize their use and overcome these

challenges. Nevertheless, the potential of bicelle beads to revolutionize cosmetic products by offering targeted, efficient, and stable delivery of active compounds underscores their importance in the future of cosmetic science.

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