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Factors Involved in Weight Gain after Bariatric Surgery

By Amanda Barbosa Cavalcanti, Queren Hapuque Fuentes Martins & Mônica Fernandez

Universitário São Camilo

Abstract- *Objective:* Identify the main causes of weight regain after bariatric surgery.

Method: For this study, research was carried out in magazines and websites that compile scientific articles, namely Scielo, Pubmed, Capes. This systematic review provided scientific coverage in Portuguese and English, with the delimited period from 2013 to 2024 collecting twenty articles, five of which were discarded for being inconclusive or incomplete.

Keywords: "*obesity*", "*bariatric surgery*", "*weight regain*".

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Factors Involved in Weight Gain after Bariatric Surgery

Fatores Envolvidos No Reganho De Peso Após Cirurgia Bariátrica

Amanda Barbosa Cavalcanti [α], Queren Hapuque Fuentes Martins [σ] & Mônica Fernandez [ρ]

Resumo- Objetivo: Identificar as principais causas do reganho de peso pós cirurgia bariátrica.

Método: Paraeste estudo foram realizadas pesquisas em revistas e sites compiladores de artigos científicos sendo eles, Scielo, Pubmed, Capes. Esta revisão sistemática conferiu uma abrangência científica na língua portuguesa e inglesa, com o período delimitado referente a 2013 a 2024 sendo coletados vinte artigos, dos quais cinco descartados por serem inconclusivos ou incompletos.

Resultado: quinze estudos que compõem essa revisão sistemática, dos quais foram avaliados 11.559 pacientes em pós cirurgia bariátrica com média de 84% do gênero feminino e tempo do início do reganho de peso ocorre em média após de 3 anos de procedimento.

Discussão: Estudos selecionadossalientam que o reganho de peso após a cirurgia bariátrica se compõem em umafase complexa, ocorrendo em diferentes períodos após cirurgia. A recuperação de peso pode ocorrer entre 1 ano a 5 anos com média de 3 anos pós procedimento, e é de extrema importânciao acompanhamento continuo à longo prazo e individualizado por equipe multidisciplinar. Os estudos apontam como principais causas relacionadas ao reganho de peso: erros comportamentais alimentares e falta de atividade física além de fatores psicológicos.

Conclusão: O acompanhamento de equipe multidisciplinar para o paciente pós cirurgia bariátrica é essencial, através desse suporte o paciente receberá orientações do consumo alimentar, suporte psicológico e psiquiátrico, além de intervenções médicas clínicas ou cirúrgicas se necessário. Desta forma será possível a manutenção da perda de peso e a melhora da qualidade de vida com o efetivo sucesso da cirurgia bariátrica, deve-se enfatizar que para obtenção do sucesso da perda e manutenção do peso pós cirurgia bariátrica, o paciente deve ter a perda e manutenção do peso pós cirurgia bariátrica, o paciente deve ter a consciência de buscar mudança no estilo de vida e optar por boas escolhas ao decorrer da vida.

Palavras chaves: "*obesidade*", "*cirurgia bariátrica*", "*reganho de peso*".

Abstract- Objective: Identify the main causes of weight regain after bariatric surgery.

Method: For this study, research was carried out in magazines and websites that compile scientific articles, namely Scielo, Pubmed, Capes. This systematic review provided scientific coverage in Portuguese and English, with the delimited period from 2013 to 2024 collecting twenty articles, five of which were discarded for being inconclusive or incomplete.

Result: fifteen studies that make up this systematic review, of which 11,559 patients were evaluated after bariatric surgery, with an average of 84% female and the time of beginning of weight regain occurring on average after 3 years of procedure.

Discussion: Selected studies highlight that weight regain after bariatric surgery involves a complex phase, occurring at different periods after surgery. Weight recovery can occur between 1 year and 5 years, with an average of 3 years post-procedure, and continuous long-term and individualized monitoring by a multidisciplinary team is extremely important. Studies point to the main causes related to weight regain: behavioral eating errors Monitoring a multidisciplinary team for the patient after bariatric surgery is essential, through this support the patient will receive guidance on food consumption, psychological and psychiatric support, in addition to clinical or surgical medical interventions if necessary. In this way, it will be possible to maintain weight loss and improve quality of life with the effective success of bariatric surgery. It must be emphasized that to achieve successful weight loss and maintenance after bariatric surgery, the patient must be aware to seek changes in lifestyle and opt for good choices throughout life.

Keywords: "*obesity*", "*bariatric surgery*", "*weight regain*".

I. Introdução

A Organização Mundial da Saúde (OMS, 2024) define a obesidade como o acumulo excedente de tecido adiposo, podendo provocar danos à saúde. Quando o indivíduo apresenta valores maiores ou igual ao índice de massa corporal (IMC) de 30 kg/m^2 é classificado como obeso. O sobrepeso e a obesidade se apresenta no Brasil de forma ascendente ocorrendo em todas as faixas etáriassegundo a pesquisa realizada pela Sociedade Brasileira de cirurgia bariátrica e metabolic (SBCBM, 2023), queidentificou aproximadamente 6,7 milhões de pessoas classificadas como obesas no país. Estudo realizado por MELO et al. (2020) observou que este fenômeno ocorre devido a diversos fatores, sendo eles fatores psicológicos, comportamentais, dentre eles: o estilo de vida, hábitos alimentares, sedentarismo, sono desregulado, genética, fatores socioeconômicos e políticos. Segundo o estudo de PENTEADO et al. (2022), a obesidade acomete o organismo provocando o surgimento e desenvolvi-

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mento de diversas doenças crônicas não transmissíveis (DCNT´s), sendo elas: diabetes tipo 2, doenças cardiovasculares, hipertensão, acidente vascular cerebral e câncer. A obesidadeinterfere na qualidade de vida, promovendo dificuldadesna interaçãosocial, causando consequências na autoestima, dando inícioao desenvolvimento de depressão, podendo ocasionar a redução da expectativa de vida. (CASTANHA etal., 2018). O tratamento deve ser multidisciplinar, promovendo a mudança no estilo de vida e consumo alimentar (MELO et Al., 2020). Em 1970 ocorre o surgimento da cirurgia bariátrica, dando expectativas a população acometida pela obesidade grave, visando tratamento, promoção da perda e manutenção de peso, e por consequência melhora na qualidade de vida de acordo com a Sociedade Brasileira De Cirurgia Bariátrica E Metabólica (SBCBM, 2016). A cirurgia bariátrica é realizada para tratar casos de obesidade grave, para valores maiores de 40kg/m^2 de IMCou valores de 35kg/m^2 com a presença de comorbidades, tem por finalidade, reduzir o tamanho original do estômago e /ou alteração da absorção dependendo da técnica utilizada, tendo como consequência, a redução do consumo alimentar de forma quantitativa BRASIL (2021). De acordo com as pesquisas realizadas, destaca-se que após a realização do procedimento, alguns pacientes podem adquirir vícios ou distúrbios comportamentais, é de relevante importância o acompanhamento multidisciplinar antes e após procedimento cirúrgico a fim de tratar com antecedência possíveis alterações, como certas compulsões no consumo alimentar (ALDANA *et al.,* 2023). Uma das preocupações que devem ser levadas em consideração após o procedimento é o risco do reganho de peso. De acordo com o estudo realizado por FERREIRA et al. (2023), 90% dos pacientes bariátricos, apresentaram reganho de peso após 2 anos de procedimento.Neste contexto esta revisão sistemática apresenta como objetivo identificar as principais causas do reganho de peso pós cirurgia bariátrica.

Objetivo: Identificar as principais causas do reganho de peso pós cirurgia bariátrica.

Método: Para este estudoforam realizadas pesquisas em revistas e sites compiladores de artigos científicos sendo eles, Scielo, Pubmed, Capes. Esta revisão sistemática conferiu uma abrangência científica na língua portuguesa e inglesa, com o período delimitado referente a 2013 a 2023 sendo coletados vinte artigos, dos quais cinco descartados por serem inconclusivos ou incompletos.

Resultados: Na tabela 1 estão descritos quinze estudos que compõem essa revisão sistemática**,** dos quais foram avaliados 11.559 pacientes em pós cirurgia bariátrica com 84% do gênero feminino e o tempo do início do reganho de peso ocorre em média após de 3 anos de procedimento.

Tabela 1: Sumário Dos Estudos E Resultados Encontrados

Autor/ Ano	Nº De Pacientes Envolvidos/ Gênero	Desenho Do Estudo	Fatores Relacionados Ao Reganho De Peso
SILVA, R. F. et.al. 2013	N. 778 84%. Feminino	Revisão	*Período de reganho de peso:* 2 anos após a cirurgia. *Principais causas do reganho de peso:* maior consumo energético, distúrbios alimentares, sedentarismo, baixa taxa de metabolismo basal, dilatação da bolsa gástrica e anastomose gastrojejunal.
BASTOS, E. C. L. et.al. 2013	N.64 89%. Feminino	Transversal, prospectivo	*Período de reganho de peso:*5 anos apósda cirurgia. % *Reganho de peso:* 28,1 % dos casos, sendo estes,18 pacientes, que tiveram reganho de peso após a bariátrica. *Principais causas do reganho de peso:* características demográficas, antropométrica, fatores de estilo de vida.
CAMBI, M, P, C. et al. 2015	N.48 91% Feminino	Prospectivo não randomizado	*Período de reganho de peso:* sem definição de tempo de pós cirurgia. Pacientes geralmente abandonam o tratamento com a equipe multidisciplinar um ano após a cirurgia.

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ABREU, A, M. et al. 2015	N.1 100%. Feminino	Estudo de caso	Principais causas do reganho de peso: Hábitos alimentares errôneos, sedentarismo, alto consumo de álcool, aumento dos diâmetros da anastomose gastrojejunal, comprimento da bolsa gástrica. *Período de reganho de peso:* 1 ano após a cirurgia. *Principais causas do reganho de peso*:descontrole alimentar, ausência de apoio familiar, alto consumo de bebidas alcoólicas, sedentarismo.
SIQUEIRA, A, C. et al. 2017	N.148 91%. Feminino	Estudo de caso	*Período de reganho de peso:*5 anos após a cirurgia *Principais causas do reganho de peso:* ansiedade, compulsão alimentar, fome em excesso, problemas familiares, descontrole alimentar, fome noturna, consumo de bebida alcoólica

Autor/ Ano	Nº De Pacientes Envolvidos/ Gênero	Desenho Do Estudo	Resultado/ Causas Do Reganho
KORTCHMARI, E. et al. 2018	N.17 65%. Feminino	Pesquisa qualitativa	problemas pessoais, angústia, insatisfação com o aumento de peso, depressão, desejo de perder peso, compulsão por doces, alimentação irregular, compulsão por comida e compras, estresse, trabalha com alimentos e consume em excesso e o fato de comer, vomitar e em seguida comer de novo Período de reganho de peso: 18 meses após a cirurgia. *Principais causas do reganho de peso:* alimentação inadequada, ato de beliscar alimentos calóricos, alto consumo de álcool. Observação: todos os participantes tiveram reganho de peso
ROLIM, F. F. A. et al 2018	N.42 76%. Feminino	Longitudinal, retrospectivo e descritivo	*Período de reganho de peso*: 2 anos pós a cirurgia. *Principais causas de reganho de peso:* Sedentarismo, falta de acompanhamento multidisciplinar, apenas 44% dos pacientes tinham acompanhamento médico, 11,9% acompanhamento nutricional. *%Reganho de peso:* A média de reganho ponderal foi de 22,3%. Os pacientes foram reganhando mais de 15,3% do peso mínimo alcançado. *Observações:* devido ao estudo ter sido realizado com uma população de baixa renda, classificados em (D e E), teve como consequência o desafio de estilo de vida saudável e adequado.
MACHADO, M, M et al. 2019	N.124 89%. Feminino	Transversal longitudinal	*Período de reganho de peso:* sem definição do tempo de pós cirurgia. *Principais causas do reganho de peso:* Hábitos alimentares inadequados, alto consumo de álcool, sedentarismo, aumento do consumo energético.

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Autor/ Ano	Nº De Pacientes Envolvidos/ Gênero	Desenho Do Estudo	Resultado/ Causas Do Reganho
MENEGOTTO, R, G et al. 2021	N.9.617 84%. Feminino	Revisão não sistemática	*Tempo de reganho de peso:* 1 a 2 anos após a cirurgia bariátrica *Causas do reganho de peso:* Sedentarismo, alto consumo de alimentos de alta caloria como fast-food, falta de alto monitoramento, fatores hormonais, secreção de hormônios gastrointestinais após a cirurgia, como GIP e GLP-1, técnica cirúrgica, fatores psicológicos, como motivação interna, apoio social e estratégias para manutenção de perda de peso.
GEBARA S, S, T et al. 2021	N.16 75%. Feminino	Pesquisa Qualitativa	*Tempo de reganho de peso:* não especifica um período exato para o reganho de peso, mas menciona que após 2 anos de operação, há prevalência de reganho de peso. *Causas do reganho de peso:* hábitos Alimentares, sedentarismo, fatores psicológicos como transtornos alimentares e comportamentos alimentares
BRANDÃO L, G, V, A et al. 2022	N.289 87%. Feminino	Observacional, transversal	*Tempo de reganho de peso:* 2 anos após a cirurgia bariátrica *Causas do reganho de peso:* Consumo excessivo de álcool após a cirurgia, dificuldade nos novos hábitos alimentares que os pacientes não tinham antes (hábitos saudáveis).
COSTA, A, C et al. 2022	N.107 93%. Feminino	Transversal	*Tempo do reganho de peso:* 3 anos após a cirurgia. *Causas do reganho de peso:* Mesmo com as mudanças de alguns hábitos alimentares, quase metade dos participantes afirmam que não aderiram a prática de atividades físicas.
TOLVANEN, L, et al. 2023	N.16 25%. Masculino 75%. Feminino	Transversal	*Tempo de reganho de peso:* Em torno de 2,6 anos após a cirurgia. *Causas do reganho de peso:* Conhecimento nutricional insuficiente, falta de apoio e ferramentas para evitar o reganho de peso.
FURTADO. A, T et al. 2023	N.217 75%. Feminino 24,9%. Masculino	Observacional	*Tempo de reganho de peso:* 5,2 anos após a cirurgia bariátrica *Causas do reganho de peso:* Transtornos de compulsão alimentar, depressão e ansiedade.
SANTOS, A. L. et al. 2023	N.75 100%. Feminino	Coorte retrospectivo	*Tempo de reganho de peso:* 48 meses após a cirurgia bariátrica. *Causas dos reganho de peso:* fatores comportamentais, falta de acompanhamento da equipe multidisciplinar, sedentarismo e alterações metabólicas e hormonais.

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II. Discussão

Estudos selecionadossalientam que o reganho de peso após a cirurgia bariátrica se compõem em umafase complexa, podendo ocorrer em diferentes períodos após cirurgia. O paciente pode sofrer com o reganho de peso em um período de 1 ano a 5 anos tendo a média de 3 anos após o procedimento. É de extrema necessidadeo acompanhamento continuo à longo prazo e individualizado por equipe multidisciplinar. Os estudos indicam como principais causas relacionadas ao reganho de peso: erros comportamentais (alimentares e falta de atividade física) e fatores psicológicos. Evidenciam que o reganho de peso é algo comum, eapontaramumarecuperação de peso notável em alguns pacientes e enquanto em outros ocorrem perda de peso a longo prazo bem-sucedida. Diversos fatores afetam e prejudicam o paciente no reganho de peso, o tempo após cirurgia é primordial, podendo afetar qualidade de vida e sua saúde físicae salientam que o reganho de peso pode ocorrer de forma antecipada a lenta. De acordo com ABREU et al. (2015), KORTCHMARI et al. (2018) e MENEGOTTO et al. (2021), o reganho de peso aconteceu de forma antecipada entre 12 à 18 meses. JáSILVA et.al. (2013), ROLIM et al. (2018), MENEGOTTO et al. (2021), BRANDÃO et al. (2022), COSTA et al, (2022) e TOLVANEN et al. (2023), especificam que o reganho de peso aconteceu entre o período médio de 2 a 3 anos. Enquanto SANTOS et al. (2023), BASTOS et al. (2013), SIQUEIRA et al. (2017) e FURTADO et al. (2023) informam que o reganho de peso ocorreu de forma lenta entre entre 4 a 5 anos. MACHADO et al. (2019) e CAMBI et al. (2015) não classificaram o período de reganho de peso após a cirurgia bariátrica, enquanto GEBARA et al. (2021) não informa o período exato de acompanhamento em seu estudo de reganho de peso após a cirurgia bariátrica.Os pacientes pós cirurgia bariátrica enfrentam vários desafios relacionados ao reganho de peso, diversos e complexos fatores favorecem a este fenômeno. Os artigos científicos selecionados para este estudo, enfatizam estes elementos, evidenciando os principais desafios para o reganho de peso. Fatores comportamentais como ocomportamento alimentar praticado de forma inadequada de se alimentar, podemcontribui para o reganho de peso, dentro destes comportamentos a escolha por alimentos não saudáveis,a dificuldade no controleda velocidade do consumo alimentar, além de não realizar atividade física regular. Todos esses fatores favorecem o reganho de peso indesejado. Outrosfatores cruciais para as causas do reganho de peso, são os fatores psicológicos como: distúrbios alimentares, alto consumo de bebidas alcoólicas, fome excessiva, fome noturna e falta de monitoramento.A depressão e a ansiedade são citadas como fatores relevantes que podem contribuir para o reganho de peso de acordo com SILVA etal. (2013), CAMBI et al. (2015), ABREU et al (2015), SIQUEIRA et al. (2017), KORTCHMARI et al. (2018), MACHADO et al. (2019), MENEGOTTO et al. (2021), GEBARA et al. (2021), BRANDÃO et al. (2022) e FURTADO et al. (2023).Segundo os estudos de SIQUEIRA et al. (2017), MENEGOTTO et al. (2021) e SANTOS et al. (2023) Outros fatores são contribuintes ao reganho de peso, como por exemplo os fatores metabólicos e hormonais como a fome em excesso e a secreção de hormônios gastrointestinais (como GIP e GLP-1) após a cirurgia. Fatores relacionados à técnica cirúrgica são evidenciados como: dilatação da bolsa gástrica e anastomose gastrojejunal, podem afetar e contribuir ao reganho de peso a longo prazo(SILVA etal., 2013) e (CAMBI et al., 2015). Fatores ao apoio social, grupais e estratégias para a manutenção de perda de peso,é um suporte fundamental, e a falta de apoio familiar e problemas familiares prejudicam a perda de peso (ABREU et al., 2015) e (SIQUEIRA et al., 2017).O acompanhamento da equipe multidisciplinar, associada ao conhecimento nutricional e as ferramentas de suporte são primordiais para evitar o reganho de peso. Nos estudos avaliados, apenas 44% dos pacientes tinham acompanhamento regular com a equipe médica e 11,9% acompanhamento nutricional. O conhecimento nutricional insuficiente, falta de apoio profissional e de ferramentas para evitar o reganho de peso, também contribuíram com o insucesso do procedimento realizado (BASTOS et al., 2013), (ROLIM et al., 2018), (MENEGOTTO et al., 2021), (TOLVANEN et al., 2023) e (SANTOS et al., 2023). Em resumo, os principais fatores de reganho de peso identificados pelos autores incluem: hábitos alimentares inadequados, sedentarismo, consumo excessivo de álcool, descontrole alimentar, fatores psicológicos (como ansiedade e depressão), falta de apoio familiar, alterações metabólicas e hormonaise dificuldade em manter novos hábitos saudáveis após a cirurgia. Esses fatores variam entre os estudos, mas destacam a importância de abordagens multidisciplinares para prevenir o reganho de peso após cirurgia bariátrica.

III. Conclusão

O acompanhamento de equipe multidisciplinar para o paciente pós cirurgia bariátrica é essencial, através desse suporte o paciente receberáorientações do consumo alimentar,suporte psicológico e psiquiátrico, além de intervençõesmédicas clinicas ou cirúrgicas se necessário. Desta forma será possível a manutenção da perda do peso e a melhora da qualidade de vida como efetivosucesso da cirurgia bariátrica, deve-se enfatizar que para obtenção do sucesso da perda e manutenção do peso pós cirurgia bariátrica, o paciente deve ter a consciência de buscar

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mudança no estilo de vida e optar por boas escolhas ao decorrer da vida.

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Pulmonary Alveolar Microlithiasis, Case Report

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Summary- Pulmonary alveolar microlithiasis is a rare disease characterized by the deposition of microliths in the alveoli due to mutations in the SLC34A2 gene. The diagnosis is made more frequently between the second and fourth decade of life incidentally in chest images, it has a progressive course, with clinical-radiological dissociation, with no known effective treatment except for lung transplantation.

The case of a 37-year-old man with no personal history of exertional dyspnea is presented. Assessed by pulmonology with HRCT, which shows subpleural nodules and micronodules with diffuse pulmonary hyperdensity due to calcification, a pattern that suggests alveolar microlithiasis confirmed by histopathological study.

Keywords: pulmonary alveolar microlithiasis; microliths; calcinosis; computed tomography; lung transplant.

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Pulmonary Alveolar Microlithiasis, Case Report

Luis Eduardo Ramírez Bejarano [α], Juan Pablo Camargo [σ] & Margarita Baldion [ρ]

Summary- Pulmonary alveolar microlithiasis is a rare disease characterized by the deposition of microliths in the alveoli due to mutations in the SLC34A2 gene. The diagnosis is made more frequently between the second and fourth decade of life incidentally in chest images, it has a progressive course, with clinical-radiological dissociation, with no known effective treatment except for lung transplantation.

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I. Introduction

Pulmonary alveolar microlithiasis is a rare autosomal recessive disease caused by mutations in the SLC34A2 gene, which encodes a sodium phosphate cotransporter, leading to difficulty in its elimination and consequent accumulation (1).

Their clinical presentation is highly variable; they can remain asymptomatic for many years before developing symptoms in their third or fourth decade of life. The most characteristic feature is clinical-radiological dissociation (2,3).

Confirming the diagnosis requires a lung biopsy. Currently, lung transplantation remains the effective treatment, although there is no prognostic data to determine the optimal time to refer a patient for lung transplantation (2).

A case of this condition is presented in a man whose presenting symptom was dyspnea.

II. Case Presentation

A 37-year-old Hispanic male patient, with no personal or family history. Clinical picture of several months' duration of exertional dyspnea. On physical examination, vital signs were normal, with blood pressure of 120/80 mm Hg, heart rate of 76 beats per minute, respiratory rate of 16 breaths per minute, temperature of 37°C, and oxygen saturation of 92% on room air. There were no signs of cyanosis or masses in the neck. Cardiac examination revealed a regular rhythm without murmurs, and breath sounds were diminished bilaterally. Abdominal examination revealed no masses, and pulses in the extremities were regular without edema. There was no evidence of clubbing of the nails.

Evaluated by the pulmonology service with pulmonary function tests, spirometry was normal with a forced expiratory volume in 1 second (FEV1) of 94%, forced vital capacity (FVC) of 103%, and FEV1/FVC ratio of 82%. There were no post-bronchodilator changes. Diffusing capacity of the lungs for carbon monoxide (DLCO) showed a mild decrease of 74%.

Imaging studies with chest X-ray revealed extensive reticulonodular interstitial opacities predominantly in the lower lobes. High-resolution computed tomography (HRCT) showed extensive alteration of pulmonary attenuation coefficients characterized by numerous subpleural peribronchovascular nodules and micronodules with thickening of interlobular septa and calcifications of some of these, ground-glass opacities with a disordered brickwork arrangement. (Fig 1).

It was decided to perform bronchoscopy with bronchoalveolar lavage, revealing a macrophage count of 80%, lymphocytes 15%, PMN 5%, eosinophils 0%, with negative special stains including Gomori, Diff-Quik, and Ziehl-Neelsen. Biopsy specimens from wedge segments of the right upper and lower lobes showed mineralized nodules (microcalcifications) in the alveolar lumens and walls, with ruptured alveoli and mild to moderate fibrosis that focally resembled a honeycomb appearance, lymphocytic aggregates, focal ossification, and more pronounced involvement in the lower lobe, findings consistent with pulmonary alveolar microlithiasis (Fig. 2). Since there was no significant clinical deterioration or abnormalities in pulmonary function tests, follow-up was continued by the pulmonology team.

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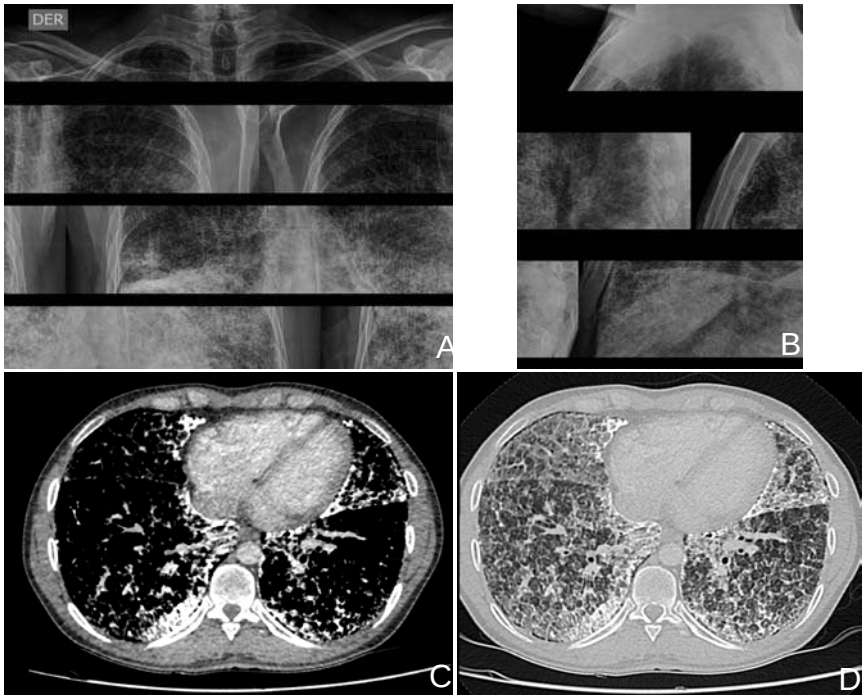


Figure 1: A and B. Chest X-ray AP and lateral views, respectively showing multiple calcified nodular opacities bilaterally distributed, predominantly in the basal and hilar regions. C. High-resolution chest CT scan, mediastinal window, axial section, demonstrating calcified subpleural and peribronchovascular nodules. D. Pulmonary window, axial section, revealing thickening of interlobular septa associated with ground-glass opacities arranged in a disordered "crazy-paving" pattern.

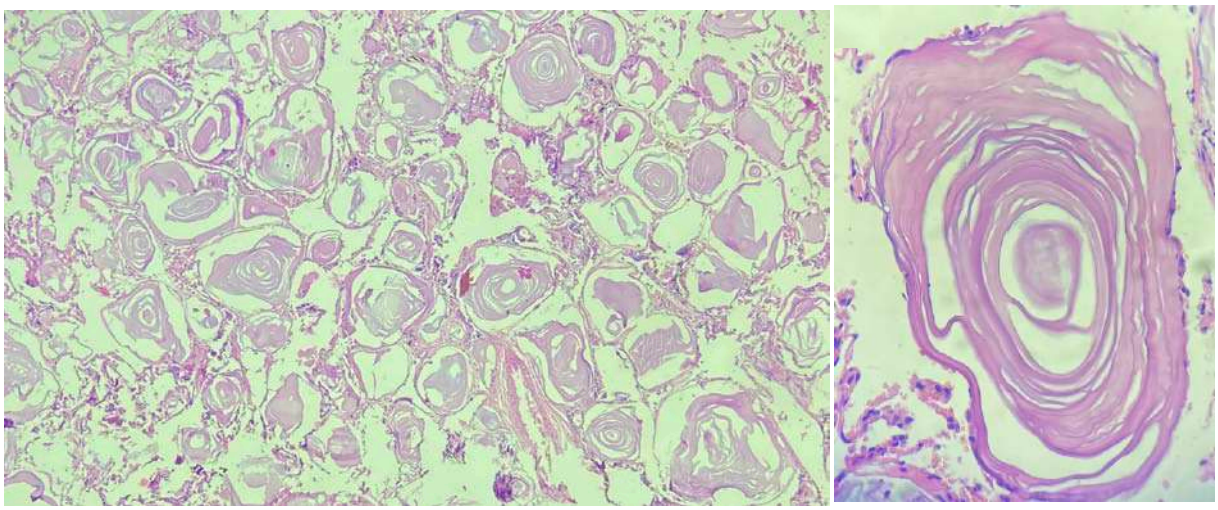


Figure 2: Hematoxylin and eosin staining. A. Multiple laminated calcospherites in the alveolar lumens and walls, and focal ossification (40x magnification). B. Laminated calcospherite (100x magnification)

III. Discussion

Pulmonary alveolar microlithiasis is an autosomal recessive disease caused by mutations in the SLC34A2 gene, which is mainly expressed in type II alveolar epithelial cells and is responsible for the absorption of phosphate released from phospholipids in surfactant (3). Loss of function of this gene can lead to decreased phosphate absorption, which may result in the formation of intraalveolar microliths due to phosphate chelation by calcium in the extracellular fluid. The severity of the disease depends on the type of mutation (exon 12, exons 7 and 8) (4,10). Currently, 1022 cases have been reported, with the majority in Asia (56.3%) and Europe (27.8%). The countries with the highest number of cases are Turkey (13.6%), China (13%), Italy (6.3%), and the USA (4.9%). The disease affects both sexes, with a slight male predominance (50.2%) and female (41.2%). Family history is present in

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37.2% (381 out of 1022 patients), with females appearing to be predominant in familial cases (1).

Most of the described cases progress asymptomatically and are incidentally diagnosed between the third and fourth decades of life. Clinical features are heterogeneous and may include dyspnea, dry cough, chest pain, and fatigue. The disease can progress slowly, remain stable, or over time progress to pulmonary fibrosis, respiratory failure, and cor pulmonale. Elevated serum concentrations of surfactant proteins SP-A and SP-D have been observed as the disease progresses, suggesting them as useful serum markers for monitoring disease activity and progression (4,5).

Pulmonary function tests are usually normal in the early stages of the disease but deteriorate over time. The main findings in spirometry include decreased forced vital capacity (FVC), normal or decreased forced expiratory volume in 1 second (FEV1), and a normal FEV1/FVC ratio, indicative of a restrictive pattern. Diffusion capacity of the lungs for carbon monoxide (DLCO) is decreased, and the 6-minute walk distance is reduced with desaturation as the disease progresses (2,4).

Chest X-ray is the initial study performed, where diffuse bilateral calcified micronodular infiltrates are documented, mainly in the middle and lower lung segments, resembling a "sandstorm" appearance. Four phases of radiographic evolution have been proposed. The first phase (precalcified) involves a small number of calcified microliths and ground-glass opacity, described in asymptomatic children. The second phase consists of scattered micronodules with diameters between 2 to 4 mm, with preserved cardiac and diaphragmatic borders. The third phase shows progressive opacification with interstitial thickening and blurring of cardiac and diaphragmatic borders. The fourth phase involves intense interstitial calcification with variable involvement of the pleural serosa, resulting in a lung "whitening" appearance (6,8,9).

High-resolution computed tomography (HRCT) identifies diffuse hyperdense micronodular opacities in the airspace, involving the posterior segments of the lower lobes and the anterior segments of the upper lobes. Microliths (calcified deposits) larger than 3 mm in diameter are also observed. Ground-glass opacities may be present, along with subpleural interstitial thickening, interlobular septal thickening, subtle cystic changes in the subpleural ventral region, and possible association with emphysema. The "black pleura" sign may also be observed, characterized by subtle subpleural cystic changes or a 1 to 2 mm wide layer of fat density between the ribs and the calcified parenchyma (2,9).

The histopathological examination reveals intra-alveolar deposits of spherical calcifications known as calcospherites, which can measure around 250 to 750 μm. Lamellated bodies with onion skin-like characteristics are also observed. Additionally, areas of interstitial fibrosis with minimal inflammatory reaction may be present (9).

There is no known effective treatment for the condition. Systemic corticosteroids, calcium chelating agents, and serial bronchoalveolar lavages have been demonstrated to be ineffective and are used as palliative treatments. Lung transplantation remains the only possible treatment for end-stage disease, with preference given to bilateral transplantation. However, there are no guidelines available for determining the optimal timing for this procedure. All patients should be referred for interdisciplinary management before they develop right ventricular dysfunction (4,7).

The present case corresponds to a patient in the fourth decade of life, where imaging and histopathological findings compatible with alveolar microlithiasis were documented. There is no history of comorbidities or family background. Clinical follow-up has remained unchanged to date. We consider the publication of this case relevant due to the scarcity of reported cases in Latin America.

IV. Conclusions

Pulmonary alveolar microlithiasis is a rare disease, hence the need to increase suspicion based on imaging findings that allow for the classification of the disease's evolutionary stage. Multidisciplinary management involving pulmonologists, radiologists, and pathologists is considered relevant to avoid misdiagnosis and unnecessary treatments.

Abbreviations:

HRCT: High-resolution computed tomography,

FEV1: Forced expiratory volume in one second,

FVC: Forced vital capacity,

DLCO: Diffusing capacity of the lungs for carbon monoxide,

SP-A: Surfactant protein A,

SP-D: Surfactant protein D.

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Palliative Care in the Intensive Care Unit and in Emergencies: Perception of the Multidisciplinary Team in the São Francisco Valley

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Abstract- Palliative care is an approach that consists of assistance provided by a multidisciplinary team, aiming to offer quality of life to patients facing life-threatening illnesses, with no prognosis of cure, and their families. Thus, the objective of this study is to evaluate the perception of the multidisciplinary team in the emergency and ICU departments of the São Francisco Valley regarding palliative care. For this purpose, a descriptive, exploratory, qualitative-quantitative research methodology was adopted.

Keywords: *continuing care, interdisciplinary communi-cation, self-assessment.*

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Palliative Care in the Intensive Care Unit and in Emergencies: Perception of the Multidisciplinary Team in the São Francisco Valley

Iana Gonçalves de Souza Santos [α], Maria Isabel Rodrigues do Nascimento [σ], AndhiaraLoyse de Lima Ferreira Brandão [ρ], Lorena Nascimento da Silva [ω], Simone de Souza Macêdo [¥] & Luciana Brito Da Silva Lins [§]

Abstract- Palliative care is an approach that consists of assistance provided by a multidisciplinary team, aiming to offer quality of life to patients facing life-threatening illnesses, with no prognosis of cure, and their families. Thus, the objective of this study is to evaluate the perception of the multidisciplinary team in the emergency and ICU departments of the São Francisco Valley regarding palliative care. For this purpose, a descriptive, exploratory, qualitative-quantitative research methodology was adopted. The data were collected through a semi-structured questionnaire consisting of six objective questions, applied via the Google Forms platform to the multidisciplinary teams of hospitals located in the cities of Juazeiro-BA and Petrolina-PE, which make up the São Francisco Valley. The study included the participation of 72 health professionals, of which 45.85% (33) were nurses, 31.94% (23) were physiotherapists, 20.83% (15) were doctors, and 1.39% (1) were not specified. The majority of participants (39.7%) stated that they did not receive sufficient training on palliative care during their undergraduate studies. Additionally, 37.0% of professionals do not feel capable, and 34.2% feel very little capable of communicating bad news. However, the majority (58.9%) consider themselves able to provide palliative care from the emergency department to terminally ill patients in the ICU. It was concluded that there is a deficit in professional training regarding palliative care, indicating unpreparedness in providing quality assistance by the multidisciplinary team. Therefore, it is necessary to conduct training that allows discussions on this topic in the workplace, aiming to ensure quality of life and assistance for patients and their families, as well as to promote continuous education systems and the strengthening of specializations in palliative care.

Keywords: Continuing care, interdisciplinary communication, self-assessment.

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I. Introdução

A Organização Mundial de Saúde (OMS) definiu em 1990 e atualizou em 2002 Cuidados Paliativos (CP), como uma abordagem que consistem na assistência promovida por uma equipe multidisciplinar, objetivando qualidade de vida aos pacientes, que enfrentam doenças ameaçadoras da vida, não possuindo mais prognóstico de cura, e a seus familiares, por meio de prevenção, amenizando o sofrimento físico ou qualquer outro problema de natureza biopsicossocial e espiritual (Matsumoto, 2012). Os CP são designados para pacientes com doenças em que o tratamento curativo não foi atingido, confunde-se seus conceitos com o Cuidado de Fim de Vida (CFV), esse equívoco de que CP é sinônimo de paciente terminal pode ser atribuída por uma falta de informação e compreensão dos profissionais, que também têm dificuldades em definir qual assistência os pacientes devem receber e quais condutas devem ser adotadas. Além disso, ainda há um défice na formação dos profissionais de saúde em relação aos CP (Gulini *et al*., 2017; Cardoso *et al*., 2013).

No Brasil a resolução nº 41 (2018) normatizou os CP no Sistema Único de Saúde (SUS) permitindo que as redes de Atenção Primária à Saúde (APS) assegurem e promovam esses cuidados, uma vez que os CP tiveram nos últimos anos um enfoque maior em âmbito hospitalar, ressaltando que é na APS o primeiro contato da sociedade com os serviços de saúde. Para essa integração em rede cabe aos governos proporcionarem que estes cuidados estejam inseridos em todos os âmbitos de atenção à saúde (Brasil, 2018). A Unidade de Terapia Intensiva (UTI) é descrita como unidade de internação de pacientes críticos, que necessitam de atenção integral e monitorização constante. Com avanço das tecnologias utilizadas nesses ambientes se torna maior a perspectiva terapêutica, porém, não garante o alívio do sofrimento humano, e muitas vezes promovem sem prognóstico de cura, recebam assistência inadequada, quase sempre pautada na tentativa de cura por meio de métodos invasivos e de alta tecnologia. Tal conduta prolonga

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desnecessariamente o processo de morrer com tratamento artificial e ineficaz (Amib, 2019).

Nesse contexto, nas UTIs e nas emergências os CP objetivam uma assistência a fim de reduzir as internações desse perfil de pacientes (Queiroga*et al*., 2020). Assim os serviços de emergência, locais onde as pessoas mais procuram em situações urgentes e de criticidade agudizada, embora não seja considerado o local ideal para iniciar os CP, os médicos do hospital podem auxiliar na identificação dos objetivos de atendimento do paciente e na discussão do prognóstico. A abordagem inicial é fundamental para determinar a trajetória dos pacientes, bem como o conhecimento da equipe entre intervenções necessárias e o reconhecimento do paciente em CFV é modificador de desfechos (Mierendorf; Gidvani, 2014).

A demanda de intervenções voltadas para os pacientes em CP é uma crescentedevido ao aumento do envelhecimento populacional (Dixon, 2021). Dessa forma, cabe ao profissional de saúde ponderações éticas, incluindo a necessidade de ter conhecimento sobre conceitos de distanásia, eutanásia, e ortotanásia, envolvendo princípios da bioética (Mota*et al*., 2021).

A distanásia são ações da equipe de saúde desproporcionais, que tornam a morte ainda mais dolorosa, não permitindo uma morte digna por causar sofrimento ao paciente e seus familiares. Já, a eutanásia, é definida como a interrupção intencional da vida, com a finalidade de evitar o sofrimento do enfermo, o que no Brasil é ilegal, em contrapartida vem a ortotanásia, é a morte em seu processo natural, no momento certo, respeita os direitos do indivíduo e seus desejos, atua na assistência integral ao paciente com abordagens terapêuticas direcionadas ao alívio do sofrimento, guarda a dignidade humana na finitude da vida (Cano*et al*., 2020; Silva, 2018).

Os CP têm em seu princípio embasado no trabalho multidisciplinar, com abordagem do cuidado frente à realidade do fim da vida humana. Contudo, não está relacionado à eutanásia, e, por profissionais de saúde não terem esses conceitos bem definidos acabam confundido tal prática, causando equívocos e inseguranças nas tomadasde decisões quanto à realização de intervenções em pacientes que poderiam se beneficiardesta terapêutica (Ancp, 2018).

Diante disso é fundamental ressaltar que a equipe tenha competência e destreza para prestar cuidados básicos e que seja composta por profissionais capacitados em CP, se tornando necessário a colaboração de instituições de ensino, como Universidades, para disseminar informações e apoiar pesquisas sobre o tema, além da educação em serviços e a inclusão do tema no processo de formação destes profissionais (Silva*et al*., 2016).

Assim, é essencial mensurar o entendimento dos profissionais de saúde sobre essa temática, para a evolução e contribuição do cuidado ofertado, tencionando condutas mais assertivas a respeito, visto que os CP é uma das áreas pouco perscrutada principalmente na graduação.

Portanto, o objetivo desse estudo foi avaliar a percepção da equipe da equipe multiprofissional nas emergências e UTI do Vale do São Francisco sobre CP.

II. Metodologia

A pesquisa desenvolvida pertence ao projeto denominado “Cuidados paliativos nas Unidade de Terapia Intensiva e nas emergências: Percepção da equipe interdisciplinar, no Vale do São Francisco”.

Refere-se a uma pesquisa descritiva, exploratória e quali-quantitativa. Para tanto, aplicou-se um questionário semi-estruturado composto de seis perguntas objetivas, aos profissionais de saúde (médicos, enfermeiros e fisioterapeutas) a respeito da temática, CP.

A aplicação do questionário foi realizado através do *Google Forms*, direcionados às equipes multidisciplinares dos hospitais localizados nas cidades de Juazeiro-BA e Petrolina-PE que integram o Vale do São Francisco.

Por se tratar de uma pesquisa que envolve seres humanos, o projeto foi submetido ao Comitê de Ética em Pesquisa do Instituto Mantenedor de Ensino Superior da Bahia – IMES, CAAE 64576622. 9.0000.5032, com parecer de aprovação número 6.037.809. Os profissionais que concordaram em colaborar com o estudo assinaram o Termo de Consentimento Livre e Esclarecido (TCLE) o qual assegura o anonimato dos voluntáriosde acordo com a resolução do Conselho Nacional de Saúde (CNS) 466/2012 (Brasil, 2012).

Os dados obtidos foram analisados por meio da técnica de análise descritiva. Os resultados foram transcritos para Programa Microsoft Office Excel e calculadas as frequências relativas e absolutas das variáveis, sendo posteriormente representadas por meio de tabelas.

III. Resultado e Discussão

Participaram da pesquisa 72 profissionais de saúde, sendo 45,85% (33) enfermeiros, 31,94% (23) fisioterapeutas, 20,83% (15) médicos e 1,39% (1) não informaram sua profissão (Tabela 1).

CP são entendidos como serviços prestados por uma equipe multidisciplinar com objetivo de melhorar a qualidade de vida do paciente e da família, diante do diagnóstico de uma doença que ameace a vida (OMS, 2023). O alívio do sofrimento, o conforto, o tratamento da dor e dos inúmeros sintomas associados sejam físicos, espirituais, sociais ou psicológicos tornam-se os objetos do tratamento (Santo*et al*., 2020).

Diferentes critérios são utilizados para analisar as modalidades de equipe: qualidade da comunicação,

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especificidades dos trabalhos especializados, questionamento da desigual valoração social dos diferentes trabalhos, flexibilização da divisão do trabalho, autonomia profissional de caráter interdependente e construção de um projeto assistencial comum (Pereira & Lima, 2008).

A participação da enfermagem na assistência aos CP requer do enfermeiro uma sistematização eficaz do cuidado, bem como o planejamento e a implantação de ações que visam a promover a autonomia do paciente junto com a família, sobre sua própria doença (Meireles *et al*., 2020).

Tabela 1: Análise descritiva do questionário aplicado as equipes multidisciplinares dos hospitais localizados nas cidades de Juazeiro-BA e Petrolina-PE que integram o Vale do São Francisco (n=72)

Perguntas	Variáveis	Frequência (%)
Qual a sua formação profissional?	Enfermeiros	33 (45,6%)
	Fisioterapeutas	23 (31,9%)
	Médicos	15 (20,8%)
	Não informado	1 (1,4%)
Recebeu informações e treinamentos suficientes durante a graduação sobre pacientes em estado terminal?	Não	28 (39,7%)
	Sim	21 (28,8%)
	Muito pouco	23 (31,5%)
Recebeu orientações e se julga capacitado(a) para comunicar más notícias?	Não	25 (34,2%)
	Sim	21 (28,8%)
	Muito pouco	26 (37,0%)
Existe desconforto entre profissionais e pacientes, na abordagem sobre cuidados paliativos?	Não	6 (8,2%)
	Sim	66 (91,8%)
Considera que o reconhecimento desde a emergência ou nas UTIs evitam intervenções que tragam sofrimentos aos pacientes e seus familiares?	Não	1 (1,4%)
	Sim	71 (98,6%)
Se auto avalia capacitado a prestar cuidados paliativos?	Não	5 (6,8%)
	Sim	42 (58,9%)
	Muito pouco	25 (34,3%)

Fonte: Autores, 2023

Dos entrevistados, a maior parte 39,7% (28) afirmaram não ter recebido treinamento suficiente sobre pacientes em situação terminal enquanto cursavam agraduação, já 28,8% (21) dos entrevistados afirmaram que tiveram o treinamentosuficiente enquanto os outros 31,5% (23) admitiram ter recebido um pouco detreinamento (Tabela 1).

Existe uma expectativa que esse quadro mude, pelo implemento e reconhecimento da área diante dos Conselhos Federais de cada profissão.

O Conselho Federal de Fisioterapia e Terapia Ocupacional (COFFITO), no exercício de suas atribuições legais e regimentais, traz na resolução nº 539, de 27 desetembro de 2021 sobre a atuação do fisioterapeuta em ações de CP, reconhecendo no Art.1º como área de atuação própria da fisioterapia (COFFITO, 2021).

Com relação ao Conselho Federal de Medicina (CFM), a Associação Médica Brasileira (AMB) e a Comissão Nacional de Residência Médica (CNRM), a nova redaçãodo Anexo II da Resolução CFM Nº 1.845/08, celebra o convênio de reconhecimento deCP como especialidades médicas, porém somente em agosto de 2011 é que a medicinapaliativa veio se tornar uma área de atuação médica, segundo resolução 1973/2011 (CFM,2011). E apenas em abril de 2022, o Ministério da Educação (MEC) aprovou a nova matrizde competências de Residência Médica para Área de Atuação em Medicina Paliativa noBrasil sendo a partir de 2023, um programa que passa a contar com dois anos de formação.

Já quanto ao Conselho Federal de Enfermagem (COFEN), considera o parecer de Conselheiro nº 221/2022 e a decisão em sua 544ª Reunião Ordinária, consta nosautos do Processo Administrativo COFEN nº 870/2022, Art. 1º Aprovar o registro daAcademia Nacional de Cuidados Paliativos (ANCP) no Conselho Federal de Enfermagemo reconhecimento ao título de Especialista em Enfermagem em Cuidados Paliativos.

Os CP resgatam a morte com dignidade, e esse é um dos principais objetivos dos profissionais paliativistas (Kovács, 2014).

Quando questionados se receberam devida orientação na graduação e/ou se julga capacitado para comunicar más notícias, 37%,0 (26) muito pouco, 34,2% não (25) e 28,8%(21) afirmam que sim (Tabela 1).

A "má notícia" é definida como informação que carrega enorme valência emocional e tem o potencial de mudar a vida e a perspectiva de futuro das pessoas. Naárea da saúde, tradicionalmente, os exemplos de Comunicação de Más Notícias (CMN)passam pelo

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diagnóstico de doenças ameaçadoras de vida, amputação de membros,comunicação sobre a morte de um familiar. Contemporaneamente, além das citadas, incluem-se as doenças que interferem na qualidade de vida (Camargo *et al*., 2019; Vogel*et al*., 2019).

O eficiente treinamento de habilidades de comunicação pode evitar a construção de uma barreira que evita uma comunicação subsequente. Assim, a comunicação devepermitir a passagem de mensagens de maneira firme, porém com prudência e esperança.

A atitude do profissional e a capacidade de comunicação desempenham um papel fundamental e decisivo no modo que o paciente e seus familiares enfrentarem o problema(Muller, 2002).

Quando nos comunicamos com pacientes e familiares, devemos estar preparadospara acionar tanto as suas emoções como as nossas, pois a comunicação empática envolve a influência das emoções no modo de expressar a mensagem proferida. Podemos resumir como quatro características principais da comunicação empática em saúde: identificar a perspectiva do outro e entendê-la como verdade, não julgar em hipótese alguma, reconhecer as emoções do outro e comunicar ao outro o que percebeu (Carvalho*et al*., 2018).

Ao considerar se esse assunto ainda é pouco proferido e que pode gerar um certo desconforto entre os profissionais e pacientes, 91,8% (66) afirmam que sim e 8,2% (6) não (Tabela 1).

Para o atendimento ser integral, o encontro com o usuário deve ser guiado pela capacidade do profissional de compreender o sofrimento que se manifesta e o significadomais imediato de suas ações e palavras; no contexto desse encontro concreto, "deixar devigiar e controlar, para dar lugar à emancipação, à maior autonomia por parte dos sujeitosque sofrem ou que podem vir a sofrer" (Mattos, 2008, p. 348).

A formação e a capacidade profissional, gera estabilidade e segurança para condução e atuação das técnicas. O que condiz com o achado do estudo, que o desconfortogerado entre profissionais ao realizar as condutas e a carência de informações recebidasdurante a graduação.

Considera-se que reconhecimento precoce desde a emergência ou nas UTIs do paciente candidato a CP, pode evitar intervenções que tragam sofrimentoadicional ao paciente e seus familiares, a porcentagem de afirmação foi ainda maior:98,6% (71) concordaram que o reconhecimento pode evitar intervençõesdesproporcionais, já o outro entrevistado, que representa 1,4% (1) dos entrevistados nãoconcorda(Tabela 1).

Entretanto, a influência do modelo biológico leva os pacientes em CP a findar suas vidas em leitos da UTI e outros serviços hospitalares, o que exige da equipemultidisciplinar uma busca incessante na melhoria da qualidade de vida dessas pessoas.

Todos os membros da equipe pontuam um único objetivo, o alívio da dor e dos sintomas associados, no entanto, cada categoria possui uma forma de otimizar esses cuidados (Pires *et al*., 2020).

Quanto ao se avaliarem capacitados a prestarem CP a maioria 58,9% (42) dos profissionais entrevistados afirmaram que sim, desde a emergência até pacientesinternados na UTI em estado terminal, 6,8% (5) admitiram não ter autonomia suficiente,já para 34,3% (25) responderam que haveria um pouco de capacidade(Tabela 1).

O cuidado exige um ato efetivo, no qual a pessoa cuidadora beneficia o outro vulnerável de algum modo (Dall'agnol, 2012). Fenomenologicamente, o cuidado éum modo de ser, de existir dos sujeitos (Perovano, 2014).

Corroborando com Fernandes et al. (2020) em um estudo observacional, transversal, quantitativo que verifica a autoavaliação do conhecimento de médicosresidentes do Hospital Universitário Lauro Wanderley (HULW) acerca dos CP, com 172médicos, sendo que apenas 99 participaram da pesquisa. A maioria respondeu que aprendeu sobre ocontrole dos sintomas comuns na assistência paliativista, embora 97% necessitassemaperfeiçoar seus conhecimentos. Apenas 16,2% conheciam a atual Lei de Bases do CP.

Contudo, mais de 75% de respostas compatíveis com conhecimento sobre CP ocorreram em apenas 5 das 16 questões(31,2%). Assim confirma a relativa escassez de conhecimentoacerca dos CP entreos médicos entrevistados.

A Lei 52/2012 de 5 Setembro - Lei de Bases dos CP consagra o direito e regula o acesso dos cidadãos aos cuidados paliativos, define a responsabilidade do Estado emmatéria de cuidados paliativos e cria a Rede Nacional de Cuidados Paliativos (RNCP), afuncionar sob tutela do Ministério da Saúde (Brasil, 2012).

Os CP envolvem o entendimento de que a morte faz parte da vida e que não há porquê prolongar o sofrimento. Através da abordagem multiprofissional, foca-se nasnecessidades dos pacientes e seus familiares no intuito de melhorar a qualidade de vida einfluenciar, de forma positiva, o curso da doença (Manso*et al*., 2017), subsidiando aassistência aos pacientes, aliviando o sofrimento resultante de terapias excessivas epromovendo a otimização de recursos materiais e humanos (Souza, Lacerda&Lira, 2017).

IV. Conclusão

A pesquisa possibilitou compreender a percepção sobre CP da equipe multidisciplinar do Vale do São Francisco. A maioria dos participantes afirmam não ter recebido treinamento suficiente sobre pacientes nesse perfil durante a graduação, bem como julgam-se não capacitados e muito pouco capacitados a

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comunicarem más notícias.Entretanto, apesar desses achados, a maioria considera-se aptos a prestarem CP nas emergências e nas UTIs.

Nesse contexto, é necessário à inserção de matérias voltadas ao tema durante a graduação e a possibilidade de aperfeiçoamento através de pós-graduação e residências, que tem sido uma crescente nos últimos anos também pelo incremento e reconhecimentodos conselhos profissionais destas áreas.

A apropriação dos conhecimentos dos CP é essencial para a garantia da dignidade humana. Ademais, é imprescindível o desenvolvimento de estudos e publicações sobre atemática, em prol de ampliar os conhecimentos dos universitários, visto a importância dapresença de uma equipe multidisciplinar especializada na área.

Portanto, é necessário a realização de treinamentos que permitam discussões desse tema no ambiente de trabalho, visando garantir qualidade de vida e assistência dospacientes e seus familiares, bem como fomentar sistemas de educação continuada e ofortalecimento das especializações em CP.

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Damage of Auditory Perception Following Firearm use: An Experimental Study Conducted on 80 Patients

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Introduction- *Noises related to the firing of a weapon derive from three sources:*

1. Noises produced by the firing and ejection mechanism of the weapon;
2. Noises produced by the firing gas expansion of the weapon;
3. Noises produced by the projectile in the air and at the moment of impact.

With regard to the first point, in ordinary repeating weapons there is only the noise of the trigger pull and the firing pin striking the primer; in automatic weapons there may be the noise of the beating mass striking, retroceding and recambering a cartridge [1]. Such noises are almost always masked by the sounds of the actual firing and assume some prominence only in weapons equipped with silencers [2].

Keywords: *firearm, damage, auditory perception, gunshot.*

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Damage of Auditory Perception Following Firearm use: An Experimental Study Conducted on 80 Patients

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1. Introduction

Noises related to the firing of a weapon derive from three sources:

1. Noises produced by the firing and ejection mechanism of the weapon;
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With regard to the first point, in ordinary repeating weapons there is only the noise of the trigger pull and the firing pin striking the primer; in automatic weapons there may be the noise of the beating mass striking, retroceding and recambering a cartridge [1]. Such noises are almost always masked by the sounds of the actual firing and assume some prominence only in weapons equipped with silencers [2].

The actual firing, on the other hand, is produced by the rapid expansion of gases that exit the muzzle of the weapon with a velocity that can be twice that of the projectile and with a pressure of several hundred atmospheres [3, 4]. Three basic components can be distinguished in shot noise.

a) the precursor wave, caused by the fact that the bullet, as it travels through the barrel, accelerates and compresses the air in it, so that the bullet is preceded by a wave that reaches a pressure of several atmospheres. This wave may cumulate with that caused by those gases which, by defect of adherence between the barrel and the projectile, manage to overcome and precede the projectile.
b) the wave caused by the sudden displacement of the air mass at the muzzle of the weapon when the projectile exits from it; it is normally negligible, but assumes importance in silenced weapons;
c) the wave caused by the exit of hot gases from the blast (muzzle blast), constituting the dominant noise in nonsilenced weapons, which lasts less than 3 milliseconds [5]. The pressure of this wave depends basically on the gas pressure and this, in turn, on the length of the barrel and the type of powder. Short barrels and progressive powders result in high muzzle pressures; the opposite is true with long barrels or lively powders. A short barrel in relation to the burning rate of the powder produces a considerable increase in the intensity of firing, although it does not necessarily increase the gas pressure, since it may be the case that unburned gases come out of the barrel which, combining with the oxygen in the air, explode thunderously (muzzle fire).

There are three noises produced by the bullet during its flight:

a) The first noise is the hissing sound. It can be attributed to both vortices and the suction of air behind the projectile.
b) The second noise, analogous to the sound of the projectile bouncing back after hitting an obstacle, takes over under certain circumstances and is the buzzing noise produced by the poorly stabilized non-spherical projectile. As is well known, the rifling of the barrel imparts a very rapid rotational motion to the projectile, which can be as high as 3,000 revolutions per second. Stabilization of the bullet is never perfect, and some causes of destabilization can be a defect in the muzzle of the weapon, hitting against obstacles, crossing a liquid or solid body, etc...
c) The third sound, called ballistic wave (sonic crack), is that produced by a projectile traveling at supersonic speed (more than 330 m/sec). It is nothing more than the effect of the explosive wave of gas from the launching charge, which, suddenly releasing itself into the air at a speed greater than the speed of sound, causes a violent change in air pressure, which propagates not only forward from the muzzle of the weapon, but also in every other direction. The intensity of the ballistic wave is about 136-140 dB.

The sound spreads through the air in the form of concentric pressure waves. A projectile, which in its

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flight must overcome the resistance of the air layers and by its motion continuously presses ahead of itself, produces pressure pulses that spread through the air with relative speed equal to that of sound, but which will also be subject to being carried by the air current in the opposite direction to that of the projectile and with equal speed. This effect is confined in a cone, called the Mach cone) (Figures 1) whose vertex is the projectile and whose opening angle decreases from 180° to gradually smaller values as the velocity increases. The Mach cone separates the zone of silence, outside it, from the zone inside it where the noise is concentrated. The noise (so-called bang) is perceived by our ear only when it is hit by the front of the cone [6].

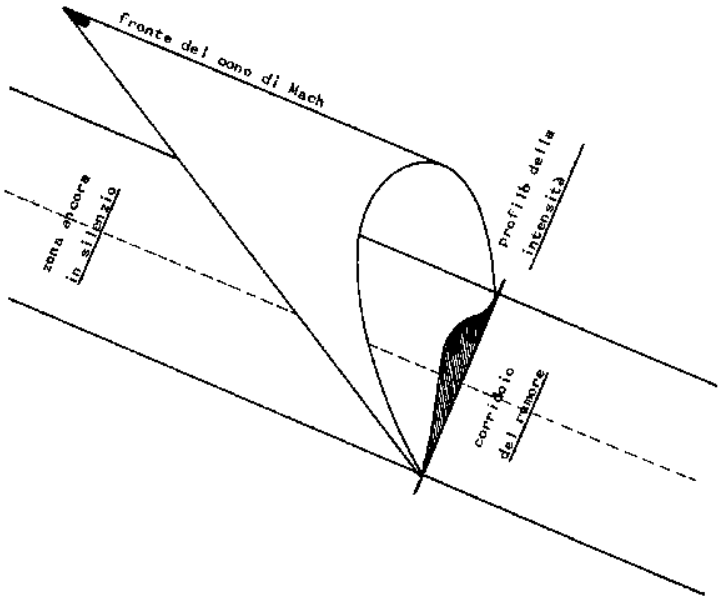


Fig. 1

In addition, the intensity of sound is inversely proportional to the distance from the sound source, that is, it decreases as one moves away from it and varies in inverse proportion to the square of the distance: with each doubling of the distance there is a decrease of 6 dB.

It must then be taken into account that different conditions of the atmosphere passed through contribute to the attenuation. There are no precise data on attenuation due to rain, fog, or falling snow; it is generally accepted to be around 15 dB per kilometer. When sound spreads close to the ground there is also absorption by vegetation, which on soils with grass and bushes is around 0.1 dB per meter. The propagation of sound through rocks and soil is typically at least 5 times faster than the speed of sound through air. Due to temperature effects, the speed of sound varies in different atmospheric layers and sound waves are deflected upward or downward [7, 8].

As far as wind is concerned, what happens is that the speed of the wind and the speed of sound add up vectorially, and as wind speed decreases as it approaches the ground, it happens that sounds following the same direction as the wind are deflected toward the ground and those against the wind are deflected upward.

The presence of obstacles along the projectile's trajectory can cause reverberation (reflection of the sound wave by an obstacle placed in front of the sound source) and diffraction (a phenomenon associated with the deviation of the propagation trajectory of sound waves when they encounter an obstacle in their path), which can alter the intensity of sound.

a) Silencer

A silencer is a suppressor or moderator of sound in firearms. Silencing of firing is required in military and civilian leaders for several reasons:

- prevent immediate and accurate detection of the direction and distance from which the shot starts;
- not to alarm the opponent;
- reduce the flare, i.e., the emission of light (and fumes) and thus make the shooter less visible in low-light conditions;
- the shooter is not subject to the physical shock of firing.

The silencer can only attenuate the noise produced by the muzzle wave; on the other hand, it cannot affect in any way the noise produced by the weapon mechanism or the bullet, much less the noise of the ballistic wave. It is for this reason that in all silenced weapons employing ammunition developing supersonic velocity, an attempt is made to reduce the initial velocity of the projectile to subsonic velocity either by employing ammunition with suitably reduced launching charge, oppose by modifying the barrel of the weapon with firing

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gas intakes, which cause a decrease in pressure and consequently in velocity.

The systems devised so far to attenuate the muzzle wave all seek to subtract energy from the firing gases in various ways. The systems applied, singly or jointly are expansion of the gases in a container, absorption of heat by lamellar radiators, metal filaments, liquids, and the silencer walls themselves, formation of turbulence inside the silencer (to slow down the velocity of the gases), transformation into work of the energy of the gases, which must compress springs to escape.

In essence, a gun silencer is quite similar to a silencer for internal combustion engines, the only difference being that the former must be drilled so as to allow the bullet to pass through, which prevents total noise attenuation (this could be achieved only with practically unacceptable silencer dimensions). In some silencers the hole for the bullet is closed by one or more rubber diaphragms that are pierced by the bullet itself, or are already cross-etched so that they open as it passes through and then close again. This artifice makes it possible to gain some decibels of attenuation since the diaphragms almost completely suppress the precursor wave, but they have the drawback of having to be replaced almost after each shot.

The greatest difficulty in the construction of a silencer consists in the perfect alignment and centering of the internal components with respect to the barrel core so that the bullet passage hole is as small as possible (usually a few tenths of a millimeter larger than the bullet diameter), without compromising the safety of the shooter. In fact, upon exiting the muzzle, the bullet, as mentioned above, may not be well stabilized.

A good silencer does not alter the trajectory of the bullet and does not affect the accuracy of the weapon. If the silencer allows gases to overtake the projectile, turbulence is created that can lead to loss of stability of the projectile; this also occurs in silencers with rubber diaphragms, due to rubbing against them.

A silencer attenuates noise, at most, by 30 dB. The silencer system must be sized to the noise produced (i.e., the more powerful the shot, the bulkier the silencer will have to be or use more sound-absorbing material). A medium-caliber weapon, such as a 9 mm like that carried by the Italian police force, produces a noise of about 140-150 dB. To reduce the noise to reasonable values, indicatively to one-third of the measure expressed in dB (corresponding to an intensity of 100 million to several billion times less), silencers with a diameter between 25 and 40 mm and a length of about 20 to 35 cm must be used, i.e., much longer than a common pistol and obviously bulky compared to the weapon.

Individuals continuously exposed to noise, such as gunfire, are prone to the onset of so-called "noise hearing loss." Therefore, by means of an analytical experimental study, the authors evaluated any alterations in the hearing of 80 shooters.

II. Materials and Methods

The experimental study conducted focuses on the auditory consequences in patients exposed to the noise of rifle or pistol firing. Forty men working in the gun and using a pistol and 40 men using a rifle for recreational purposes were considered. Specifically, with regard to rifle use, 20 left-handed men and 20 right-handed men were considered. All subjects ranged in age from 20 to 60 years.

The type of gun used, the caliber of the gun, the frequency of firing during the year, subjective and objective hearing examinations, and the change in hearing perception in daily life were then analyzed by administering a questionnaire. All subjects gave accurate answers through face-to-face interview and interactive questionnaire, made through "google forms."

Interactive Questionnaire

The questions answered remotely by the subjects analyze the lifestyle and daily problems of the subjects suffering from noise hearing loss:

1. Gender
2. Age
3. Recreational or work-type shooting activity
4. Type of weapon used for shooting
5. Frequency of use of noise caps/headsets
6. Limb used to shoot
7. Frequency of firing during the year
8. Worsening of auditory perception since the start of the activity
9. Major difficulties with auditory perception in daily life (e.g., difficulty understanding TV, people, loud music)
10. Report of an audiometric examination performed
11. Any other pathologies associated with the ear
12. Discomfort while listening to noises easily tolerated by other people

The same were then subjected to specialized objective examination, which consists of viewing the ear canal and then performing tonal and speech audiometric examination in a silent booth to assess the audiometric curve.

III. Results

a) Subjects using a short Weapon

Regarding the use of a short weapon, the subjects analyzed in this study all work in the armed forces, are male, and use a Beretta model 92 FS brand pistol in 9 PARA (9 x 19 mm) caliber.

All of them reported using ear protectors during firing tests performed at the firing range. In fact, on the specialized objective examination, almost all of the

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officers did not show a decrease in hearing due to the protectors used during the firing practice at the range.

In addition, only 8 of them (20%) reported during the interview that they perceived changes related to their hearing, and thus a change in auditory perception, compared to the period prior to joining the armed forces and then using the weapon.

Table 1: Shows the responses to the questionnaire, as well as the findings of the objective examination performed on the sample of subjects who shoot a gun and are members of the armed corps

Patient	Age	History of Hearing	Changes in Hearing Perception	Headset	Limb used	Annual Frequency
1	59	normal-hearing	no	yes	right	2-3 times
2	45	normal-hearing	no	yes	right	2-3 times
3	49	mild hearing loss	recruitment	sometimes	right	2-3 times
4	51	mild hearing loss	reduced perception of sounds	yes	left	2-3 times
5	57	mild hearing loss	reduced perception of sounds	yes	right	2-3 times
6	57	mild hearing loss	slight hearing loss in everyday life	yes	left	2-3 times
7	30	normal-hearing	no	yes	left	2-3 times
8	45	normal-hearing	no	yes	left	2-3 times
9	43	normal-hearing	no	yes	left	2-3 times
10	32	normal-hearing	no	yes	left	2-3 times
11	41	normal-hearing	no	yes	left	2-3 times
12	42	normal-hearing	no	yes	left	2-3 times
13	55	normal-hearing	slight hearing loss in everyday life	yes	right	2-3 times
14	31	normal-hearing	no	yes	left	2-3 times
15	45	normal-hearing	no	yes	left	2-3 times
16	47	normal-hearing	no	yes	left	2-3 times
17	50	normal-hearing	no	yes	left	2-3 times
18	44	normal-hearing	no	yes	left	2-3 times
19	45	normal-hearing	no	yes	right	2-3 times
20	42	mild hearing loss	slight hearing loss in everyday life	no	left	2-3 times
21	51	normal-hearing	no	yes	left	da 4 a 10 times
22	39	normal-hearing	no	yes	left	2-3 times
23	43	normal-hearing	no	yes	right	2-3 times
24	40	normal-hearing	no	yes	right	2-3 times
25	42	normal-hearing	no	yes	right	2-3 times
26	58	normal-hearing	no	yes	left	2-3 times
27	57	normal-hearing	no	yes	left	2-3 times
28	33	normal-hearing	no	yes	left	2-3 times
29	41	normal-hearing	no	yes	left	2-3 times
30	29	normal-hearing	no	yes	right	2-3 times
31	35	normal-hearing	no	yes	left	2-3 times
32	38	normal-hearing	no	yes	right	2-3 times
33	28	normal-hearing	no	yes	right	2-3 times
34	50	normal-hearing	no	yes	right	2-3 times
35	57	mild hearing loss	slight hearing loss in everyday life	yes	right	da 4 a 10 times
36	43	normal-hearing	no	yes	right	2-3 times
37	31	normal-hearing	no	yes	right	2-3 times
38	35	normal-hearing	no	yes	right	2-3 times
39	42	normal-hearing	no	yes	right	usually
40	32	normal-hearing	slight hearing loss in everyday life	yes	left	2-3 times

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Table 2 shows that in only 8 cases (20 percent of the gun-shooting subjects), the same ones who reported impaired auditory perception, there is a noticeable worsening and lowering of the hearing threshold of the ear; in these cases, through a tonal audiometric test, a deep at 4000 Hz was observed, given by the gunshots.

Left-handed subjects have slightly more hearing loss in the left ear, but there is no significant difference from ear to ear. Of paramount importance to consider is the age of the subject. Those examined from about 20 to 40 years of age show no signs of hearing deterioration, especially if they use earplugs. This is likely because with advancing age, degenerative phenomena also intervene, which, together with repeated noise, are responsible for hearing impairment (EVENTUAL BIBLE).

The last column shows the PTA "Pure Tone Average," which is the average of the three thresholds 500 Hz, 1000 Hz. and 2000 Hz. It is a useful value for determining the hearing impairment of the ear.

Patient	Recruitment	Vocal Curve	Pta
1	no	normal result	30 dB
2	no	normal result	27 dB
3	sì	roll-over	60 dB
4	no	mild hearing loss	40 dB
5	no	mild hearing loss	43 dB
6	no	mild hearing loss	39 dB
7	no	normal result	25 dB
8	no	normal result	25 dB
9	no	normal result	28 dB
10	no	normal result	32 dB
11	no	normal result	25 dB
12	no	normal result	23 dB
13	no	mild hearing loss	40 dB
14	no	normal result	20 dB
15	no	normal result	27 dB
16	no	normal result	24 dB
17	no	normal result	22 dB
18	no	normal result	29 dB
19	no	normal result	25 dB
20	no	mild hearing loss	43 dB
21	no	normal result	30 dB
22	no	normal result	30 dB
23	no	normal result	28 dB
24	no	normal result	25 dB
25	no	normal result	28 dB
26	no	normal result	25 dB
27	no	normal result	28 dB
28	no	normal result	20 dB
29	no	normal result	24 dB
30	no	normal result	18 dB
31	no	normal result	21 dB
32	no	normal result	27 dB
33	no	normal result	25 dB
34	no	normal result	25 dB
35	no	mild hearing loss	47 dB
36	no	normal result	20 dB
37	no	normal result	25 dB
38	no	normal result	26 dB
39	no	normal result	30 dB
40	no	mild hearing loss	39 dB

Subjects older than 45 years show hearing impairment, which results in difficulty in perception of soft and high-pitched sounds and reduced understanding of speech. In general, in law enforcement, we do not find particular cases of hearing loss, except in middle- to older-aged subjects, where we find sensorineural hearing loss, accompanied in speech audiometry by an S-shaped curve shifted more to the right, i.e., toward higher dB, or plateau or roll-over curve, if the auditory nerve is affected.

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b) Subjects using a Long Gun

Men who use a rifle range in age from 30 to 80 years and are all male. Depending on the frequency of their play activity, they have hearing problems. In these cases, unlike the armed forces, the subjects almost never use earplugs, mainly because they need to hear their surroundings to perceive the approach of an animal. Thus, even younger people present hearing problems.

In their medical history they report discomfort in the perception of loud noises, perceived as high but bearable by normoacoustic people. Some complain of continuous subjective tinnitus and present considerable difficulty in understanding conversations, especially in noisy or crowded environments.

Objective examination shows descending audiometric curves, with medium to severe deafness in older patients, while in younger patients there is a deep at 4000 Hz. Many of the subjects have recruitment, that is, they have a lowering of the threshold of annoyance, so loud noises are difficult to tolerate.

Patient	Age	History of Hearing	Changes in Hearing Perception	Headset	Limb Used	Marca E Calibro Dell'arma	Annual Frequency
1	43	bilateral hearing loss	hearing loss in everyday life	no	right	Franchi 712 VSL caliber 12	frequently
2	75	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 times
3	18	normal-hearing	no	no	right	Beretta AL390 caliber 12	frequently
4	43	bilateral hearing loss	hearing loss in everyday life	no	right	Franchi 712 VSL caliber 12	frequently
5	61	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 times
6	73	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	4-10 times
7	59	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	4-10 times
8	79	bilateral hearing loss	hearing loss in everyday life	no	right	Franchi 712 VSL caliber 12	4-10 times
9	67	normal-hearing	no	no	right	Beretta AL390 caliber 12	2-3 times
10	59	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	frequently
11	45	normal-hearing	no	no	right	Beretta AL390 caliber 12	frequently
12	31	normal-hearing	no	qualche volta	right	Beretta AL390 caliber 12	frequently
13	41	normal-hearing	no	qualche volta	left	Beretta AL390 caliber 12	2-3 times
14	77	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 times
15	73	bilateral hearing loss	hearing loss in everyday life	no	left	Franchi 712 VSL caliber 12	frequently
16	37	normal-hearing	no	no	left	Franchi 712 VSL caliber 12	frequently
17	69	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	4-10 times
18	57	bilateral hearing loss	hearing loss in everyday life	no	left	Franchi 712 VSL caliber 12	2-3 times
19	81	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	frequently

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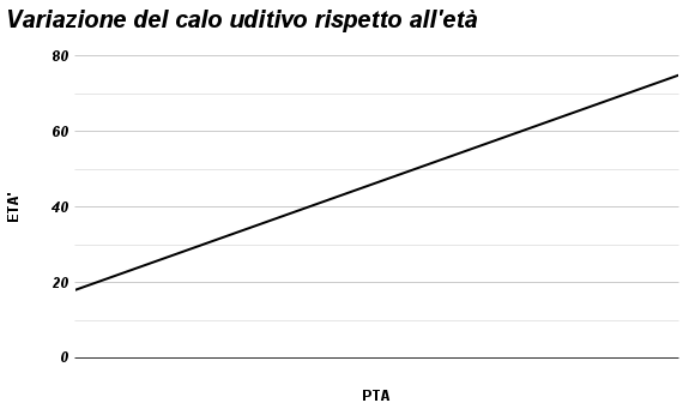
20	57	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 volte
21	62	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	4-10 times
22	80	bilateral hearing loss	hearing loss in everyday life	no	left	Franchi 712 VSL caliber 12	2-3 times
23	74	bilateral hearing loss	hearing loss in everyday life	no	right	Franchi 712 VSL caliber 12	2-3 times
24	57	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	2-3 times
25	45	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 times
26	47	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 times
27	58	bilateral hearing loss	hearing loss in everyday life	no	right	Franchi 712 VSL caliber 12	2-3 times
28	65	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 times
29	67	bilateral hearing loss	hearing loss in everyday life	no	left	Franchi 712 VSL caliber 12	2-3 times
30	73	bilateral hearing loss	hearing loss in everyday life	no	left	Franchi 712 VSL caliber 12	2-3 times
31	73	bilateral hearing loss	hearing loss in everyday life	no	both	Franchi 712 VSL caliber 12	2-3 times
32	49	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	2-3 times
33	50	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	4-10 times
34	76	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	frequently
35	77	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	frequently
36	56	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	2-3 times
37	69	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	4-10 times
38	71	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	frequently
39	78	bilateral hearing loss	hearing loss in everyday life	no	left	Beretta AL390 caliber 12	4-10 times
40	75	bilateral hearing loss	hearing loss in everyday life	no	right	Beretta AL390 caliber 12	2-3 times

Patient	Recruitment	Vocal Curve	Pta
1	yes	roll-over	58 dB
2	yes	roll-over	65 dB
3	no	normal result	19 dB
4	Yes	roll-over	55 dB
5	No	mild hearing loss	49 dB
6	No	mild hearing loss	52 dB
7	No	mild hearing loss	50 dB
8	Sì	roll-over	63 dB
9	No	normal result	23 dB
10	No	mild hearing loss	54 dB
11	No	normal result	23 dB

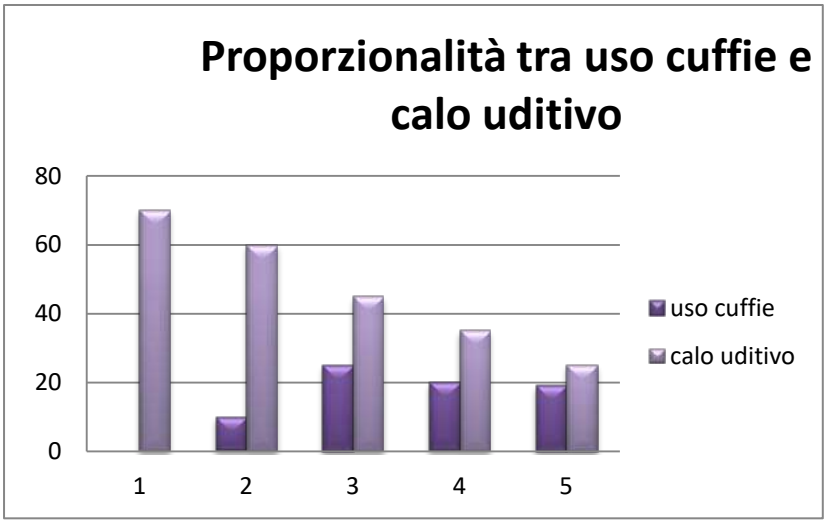
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12	No	normal result	25 dB
13	No	normal result	25 dB
14	No	mild hearing loss	58 dB
15	Yes	roll-over	65 dB
16	No	normal result	21 dB
17	No	mild hearing loss	49 dB
18	No	mild hearing loss	43 dB
19	Yes	roll-over	70 dB
20	No	mild hearing loss	51 dB
21	yes	plateau	61 dB
22	yes	roll-over	72 dB
23	no	mild hearing loss	53 dB
24	no	mild hearing loss	45 dB
25	no	mild hearing loss	60 dB
26	no	mild hearing loss	53 dB
27	no	mild hearing loss	57 dB
28	no	mild hearing loss	55 dB
29	no	mild hearing loss	59 dB
30	no	mild hearing loss	52 dB
31	no	mild hearing loss	55 dB
32	no	mild hearing loss	38 dB
33	no	mild hearing loss	45 dB
34	yes	roll-over	58 dB
35	yes	roll-over	65 dB
36	yes	plateau	58 dB
37	no	normal result	28 dB
38	yes	roll-over	60 dB
39	no	mild hearing loss	57 dB
40	yes	roll-over	58 dB

The graph relates the age of the subjects as a function of the average speech frequency (500- 1000-2000-4000) Hz. It can be seen from the graph that there is a direct proportionality between the two variables in most cases for the presbycusis component present.



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The graph above relates hearing loss to the use of protective devices by the subjects examined. It can be easily deduced that noise-exposed subjects with protection by means of ear muffs (or earplugs) had significantly less hearing loss than those who did not use them. In this study, it was also found that it is the hunters who clearly use the protective devices less, as they need to hear the surrounding noise, while the subjects who work/have worked in the weapon, rarely shoot without earphones/plugs, being on average 80% of their activity performed in the ranges.

It is noted, in subjects exposed to gunfire noise, regardless of caliber, without ear protectors, a hearing deficit, with, in the early stages, a deep visible by tonal audiometry, on the frequency of 4000 Hz. Thereafter, the curve begins to take the "downward" shape, and the subject begins to have difficulty perceiving soft and high-pitched sounds. In the last stage he will also lose the low sounds (125Hz, 250Hz, 500Hz), taking into account the subject's age, which will be more advanced. So, of fundamental importance is the age of the subject, which is the cause of presbycusis, thus the aging and death of hair cells through physiological aging, an aspect that should not be underestimated since it easily affects the psychological and social sphere of the subject, causing isolation and, in more severe cases, senile dementia.

In addition, the more frequent the exposure to noise, the greater the hearing damage, the faster the decay and death of hair cells. By voice audiometry, a curve shifted toward higher dB intensities is noted in the early stages of hearing loss (mild hearing loss), the curve rolls-over as the person becomes increasingly exposed to gunshots (in the absence of protection) and the deficit worsens, the curve turns to roll-over when the nerve is now involved. The person perceives subjective tinnitus and, in more severe cases, the phenomenon of recruitment appears, recognized by specific hearing tests mentioned above. Individuals who use hearing protectors, on the other hand, are less likely to be affected by noise-induced hearing loss, especially if the time of noise exposure is minimal.

IV. Discussion

Individuals who are continuously exposed to noise, such as gunfire, are prone to the onset of so-called "gun-shooting hearing loss." [9]. Noise-induced hearing loss is the most common occupational disease in Italy, characterized by irreversible cochlear impairment resulting from prolonged exposure to high sound levels. [10]. Specifically, there is a loss of outer hair cells and subsequent neuronal degeneration. This definition excludes deafness from acute sound trauma, which falls under the umbrella of occupational accidents, but also accidental hearing injuries from explosion or barotrauma, whose etiopathogenic mechanism is different.

Noise-induced hearing loss is a bilateral, as a rule symmetrical, sensorineural hearing loss arising from broadband and/or intermittent-acting impulsive noise of > 80-85 dB with a daily exposure duration of 6-8 hours for several years. [11]. Magnitude and progression of hearing damage depend on overload parameters (noise intensity, duration of its action, frequency components) as well as on the duration of interval phases (noise breaks) and individual sensitivity. So, we find a perceptual type of hearing loss, bilateral and symmetrical, with deep (falling) on 3000/4000 Hz and rising on 8000 Hz in the early phase (according to recent studies at least 40% of hearing losses from chronic acoustic trauma show a downward curve). The developmental course of hearing damage from noise is also characteristic: the elevation of the hearing threshold, i.e., the worsening of hearing loss detectable by tonal audiometry, may be relevant especially in the first 10 years of continued noise exposure and then stabilize; the tonal audiometric tracing faithfully follows the progression of damage to the neuroepithelium of the basal gyrus of the cochlea. What is thus evident is a

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bilateral perceptual hearing loss with substantial "tightness" of low and mid frequencies and threshold elevation from 2000 Hz to 8000 Hz in the more advanced forms. [12].

a) Prosthesization

Prosthetic therapy finds indication in all cases of hearing loss. In fact, prosthesization is commonly indicated in cases where the deficit is of such a magnitude that it results in discomfort for the patient and where there is no room for a pharmacological solution [13]

The choice of hearing aid is up to the hearing aid technician, on whom the future wearer of the device relies. This choice depends, first and foremost, on the severity of the hearing impairment and the lifestyle of the wearer. People with severe hearing impairment need powerful hearing aids. Hence, behind-the-ear aids are indicated. Conversely, if the deficit is mild (especially in pantalal deafness) an in-the-ear hearing aid may be opted for. [14].

With mild to moderate hearing impairment, consideration of the patient's lifestyle is important. For active people (e.g., young people), an in-the-ear hearing aid is the best choice, as the latter allows more freedom of movement. Conversely, for people who are sedentary or less adept at handling electronic devices (e.g., elderly), the best choice is generally the behind-the-ear type hearing aid, as it is easy to remove and manage. Usually, in people with noise-induced hearing impairment, behind-the-ear hearing aids are recommended, as the latter, compared with in-the-ear, give less sensation of "closing" and try to mask the patient's tinnitus by means of a sound stimulus originating from the device. [15, 16].

Prosthesization must obviously be preceded by a functional study that is based on:

- Tonal audiometry: to define the extent of the hearing deficit, the trend of the audiometric curve, the type of deficit [17];
- Supraliminary audiometry: in order to show whether, in case of sensorineural deficit, there is pathological recruitment or adaptation [18].
- Search for the threshold of stapedius reflex evocation: a threshold that is about 10 Db below the threshold of annoyance that should not be exceeded by amplification [19, 20]
- Speech audiometry: in order to define discriminative potential by increasing the acoustic intensity level.

The presence of recruitment can be compensated for by the introduction of prosthesis gain limitations.

Prosthesizing a noise hearing loss is one of the most challenging tasks for rehabilitative audiology. Hearing loss is limited to high frequencies with constant presence of recruitment and often tinnitus, this causes altered sound perception. [21, 22].

b) Assessment in the Medico-Legal Context

The medico-legal assessment of hearing loss in civil liability [23] distinguishes the assessment of complete deafness, unilateral or bilateral, from that of deaf-mutism, due to inability, in the latter case, to acquire adequate language in the developmental stage. The damage rate corresponds to 10% for unilateral complete deafness and 50% for bilateral complete. The evaluation of intermediate hearing deficits, which must necessarily consider that in the range between 45 and 65 dB the impairment of social auditory function is rapidly progressive, assigns a percentage of damage in relation to the frequencies and dB considered according to the following table:

The assessment of hearing ability must be carried out on a prosthetically implanted individual and involves the assignment of a damage plus of 2-6% in relation to disesthetics and limitations in daily activities resulting from the prosthesis.

In the case of unilateral intermediate hearing deficit, the overall assessment of the reduction in psychophysical integrity should be calculated according to the proportion: "deficit: 100 = psychophysical integrity : 10," where D is the percentage of hearing deficit and I is the reduction in psychophysical integrity.

The assessment of bilateral intermediate hearing deficit involves the overall calculation of impairment according to the formula: [(4 x best ear deficit) + worst ear deficit] / 5 x 0.50.

Regarding the assessment of hearing impairment in the care setting, the reference standard is Italian Ministry of Health Ministerial Decree No. 463800, 05.02.1992. The aforementioned decree specifies that the deafness entitling to the recognition of welfare benefits is that acquired in developmental age that prevents normal learning of spoken language, commonly referred to as prelingual deafness. Regarding the time limits of developmental age, the Ministerial Decree identifies the time span from birth to the age of 12. The medico-legal evaluation is to be carried out by performing oto-functional examinations with the naked ear, i.e., without a prosthesis. The score for hearing impairments with a fluctuating and discontinuous pattern over time must result from a 12-month observation period with average hearing loss assessed on 3 oto-functional examinations performed every 3-4 months.

In assigning the overall percentage of civil disability, the Italian Ministerial Decree 05.02.1992 assigns a score of 15% to unilateral total deafness and 58.5% if bilateral total. Unilateral/bilateral hearing losses equal to or less than 245 dB will have to be evaluated by calculating the sum of hearing losses in dB for the frequencies 500, 1000 and 2000 Hz. The overall

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percentage of disability will be given by the value calculated by crossing the data of the worst ear (ordinate) with the best ear (abscissa).

For the purpose of granting the nonreversible pension [24] recognition of congenital or acquired deafness during developmental age with hearing loss equal to or greater than 75 dB HTL of average between the frequencies 500, 1000 and 2000 Hz in the better ear. Upon reaching the age of 65, the pension turns into a replacement social allowance.

Additional welfare benefit for the deaf is the communication allowance, provided for by Italian Law 508/1988, which can be granted to the applicant under the age of 12 with a hearing loss equal to or greater than 60 dB of HTL averaged between the frequencies 500, 1000 and 2000 Hz in the better ear. If the applicant is above this age, the hearing loss must be 75 decibels HTL or more and the onset of hearing loss must be demonstrated before the age of 12.

In the context of occupational accidents and diseases, the medico-legal assessment of hearing loss uses as benchmarks the values indicated in the table attached to Italian Legislative Decree No. 38/2000 (commonly known as the "INAIL 2000" tables). In that normative source, the percentage value assigned to unilateral complete hearing loss is 12%, while bilateral complete deafness is assigned a value of 50%. With regard to the assessment of biological damage of bilateral partial hearing impairment, the formula "Biological damage = (best ear x 4) + worst ear x 0.5" is applied, using the values inferable from the attached table (it should be noted that the values given are super imposable on those provided by the SIMLA guidelines on the assessment of personal injury in civil law):

This evaluative procedure operates an assessment of unilateral hearing impairment on the basis of the assumption that auditory impairment is in fact impairment of sensory organ function, where in the descriptive definition of sensory organ comes to include, in the case of the ear, also the more extensive conceptual definition of equal organ as an entity, on the functional level, distinct from the pure anatomical entity for the correspondence "of function" that it performs with another organ that, morphologically, is repeated in the other half of the body. For the purposes of auditory function, organ parity (better ear vs. worse ear) results, therefore, in the expression of an "organ-functional system," i.e., an anatomical-functional system in which all anatomical structures are called upon to perform similar sensory functions [25]. In Inail, for assessment purposes, permanent impairment of the hearing organ is assessed when the average of hearing losses on the frequencies 5000-1000-2000-3000-4000 Hz is greater than 25 dB.

c) The Goals of Prosthetics

The first goal to be achieved in the prosthetic strategy in general and in noise-induced hearing loss in particular is to improve the signal-to-noise ratio (SNR).

First-generation hearing aids all have excellent and powerful amplification, controls for controlling "peak clipping" and compression of the sound signal, but non-frequency-selective linear amplification, by also raising background noise, causes distortion of the sound message with alteration of verbal intelligibility and thus comprehension [26]. Hearing aids that are digitally "programmable" by computer, although the processing of the sound signal continues to be analog, have some additional functions that allow some of the potential of the hearing aid to be improved, for example, using a program for directional listening (if you are talking to someone) or a program that allows omnidirectional listening (if you want to listen to music). This is possible and feasible if the signal is pure, i.e., does not contain added noise but only words or music. In everyday life this situation is uncommon. With the advent of digital technology it is possible to separate the voice from the noise, that is, unpacking the signifying signal from any noise elements. One no longer has a single amplification channel but a division into bands of the frequency spectrum, each with its own amplitude and compression characteristics. In a digital multiband system, it is possible to analyze the amplitude envelope of the entire frequency spectrum, identify the channels where noise is predominant, then work out a special algorithm that reduces the gain only at these bands, leaving unchanged-or increasing-the sound level for the band where the voice predominates." It is then possible to create amplification on different channels and with different characteristics (compression ratio, threshold, attack and recovery times) depending on the patient's dynamic residual hearing range. In cases of noise deafness, the most beneficial device is the behind-the-ear device: BTE (receiver behind the ear), RITE (with receiver inside the ear) or MINI RITE; progressively smaller in size. Depending on the quality of the device, one can adjust multiple frequency channels, program the device for tinnitus, and improve the sensation given by recruitment [27].

However, if the hearing loss is mild and the subject is not subject to any particular auditory consequences given by the noise, a fitting with in-the-ear devices can be done. Important is the willingness of the subject, the only one who can balance quality, design and effectiveness of the device.

V. Conclusion

In individuals with noise-induced hearing loss, prosthesizing by means of behind-the-ear hearing aids is very effective. Hearing aids, in milder cases, make people rediscover sounds that have become inaudible;

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in more severe cases, they attempt to reduce the recruitment and perception of tinnitus, through specific programs. Firststep, of fundamental importance remains that of prevention to hearing loss, in work environments using the appropriate protective equipment (noise-cancelling headphones, ear protectors) and in recreational environments, if it is not possible to use protective devices, limit noise exposure.

From the medico-legal point of view, depending on the area in which one is, it is necessary to assess the extent of the damage that has been established in order to grant him fair economic compensation. A critically important factor to be considered for compensation is whether prosthetics have been used.

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The Influence of Digital Marketing Experts on Consumer Behavior through Personalization and Interactive Engagement

By Dr. Geetha C.J

Abstract- In today's tech-driven world, Digital Marketing Experts are more vital than ever as businesses increasingly rely on digital strategies to connect with their target audience. These experts play a key role in shaping consumer behavior by designing and executing campaigns across various online platforms, including social media, search engines, and email marketing.

One of the primary ways digital marketing influences consumer behavior is through personalized content and targeted ads. By leveraging data analytics, Digital Marketing Experts craft tailored messages that resonate with specific demographics. This precision allows them to create highly relevant campaigns that capture consumer interest.

Keywords: digital marketing, consumer behavior, targeted campaigns, personalized content, data analytics, real-time feedback, social media engagement, online advertising, brand interaction, purchasing decisions.

GJMR-K Classification: JEL Code: M31, M37



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One of the primary ways digital marketing influences consumer behavior is through personalized content and targeted ads. By leveraging data analytics, Digital Marketing Experts craft tailored messages that resonate with specific demographics. This precision allows them to create highly relevant campaigns that capture consumer interest.

Additionally, the interactive nature of digital marketing offers real-time feedback, enabling experts to monitor metrics like click-through rates and social media engagement. This data-driven approach allows for continuous optimization of strategies to better align with consumer preferences.

Social media has particularly transformed consumer-brand interactions, with platforms like Facebook and Instagram serving as spaces for meaningful engagement. By actively communicating with consumers, responding to feedback, and fostering trust, brands can significantly influence purchasing decisions.

Keywords: digital marketing, consumer behavior, targeted campaigns, personalized content, data analytics, real-time feedback, social media engagement, online advertising, brand interaction, purchasing decisions.

I. Introduction

In today's digital era, the role of Digital Marketing Experts has become indispensable for businesses aiming to thrive in a highly competitive marketplace. These professionals are at the forefront of shaping how companies interact with consumers online. By leveraging data-driven strategies and targeting specific demographics, they ensure that brands can effectively reach and engage their audience. This introduction highlights the growing importance of digital marketing as a crucial component of modern business success.

Digital Marketing Experts craft and execute campaigns that resonate with consumers, using various online platforms such as social media, search engines, and email. Their ability to create personalized content based on data analytics allows them to connect with consumers on a deeper level. This precision targeting ensures that marketing efforts are not just broad strokes but are finely tuned to meet the preferences and behaviors of specific audience segments.

One of the key strengths of digital marketing is its interactive nature, which allows for real-time feedback and engagement. Digital Marketing Experts continuously monitor metrics like click-through rates and social media interactions, enabling them to refine their strategies on the go. This agility is crucial in a fast-paced digital environment, where consumer preferences can shift rapidly, and the ability to adapt is a significant competitive advantage.

Social media platforms, in particular, have transformed the way brands and consumers interact. Digital Marketing Experts use these platforms to foster meaningful connections with their audience, responding to feedback and building trust. This active engagement not only strengthens brand loyalty but also influences purchasing decisions, making social media a powerful tool in the digital marketing arsenal.

II. Literature Survey

Manisha and Shukla (2016) explored consumer behavior related to online purchases of electronic devices, focusing specifically on the cities of Bhopal and Jabalpur in Madhya Pradesh. The primary aim of their research was to better understand consumer expectations when shopping online for electronics. They sought to identify the key factors that influence online purchasing decisions and to analyze the specific needs and preferences of customers in these two cities.

Nausherwan et al. (2016) investigated key factors influencing customer behavior in online shopping. Their study highlighted that customers' concerns about safety and privacy significantly affect their purchase decisions and shopping patterns.

Shanthi and DestiKannaiah (2015) conducted research on consumer perceptions of online shopping, focusing on the types of products purchased online. The study, which surveyed 100 participants predominantly from the student community, identified several motivating factors for online purchases. These included product information, flexibility, price, product range, convenience, and delivery speed.

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Pratiksinh Vaghela (2014) examined gender differences in consumer attitudes toward online shopping. The study involved 150 respondents from various regions of Surat and employed analysis techniques such as chi-square and frequency distribution. The findings revealed a significant difference between male and female attitudes towards online shopping, with females showing a stronger inclination. The study noted that females primarily purchased clothing, groceries, and fashion accessories, while males were more likely to buy electronics and home appliances.

Kalpana Mathur and Arti Sharma (2014) investigated the habits of online consumers in India, aiming to analyze consumer behavior and identify key factors influencing their shopping patterns. The study surveyed 100 participants from diverse backgrounds, including businesspeople, working professionals, and students. Various analytical methods, such as percentage analysis, chi-square testing, and ranking, were employed to evaluate the survey data. The researchers concluded that factors such as market access, Internet availability, low prices, 24/7 service, free delivery, and cash on delivery significantly influenced consumer purchasing habits.

Girish Punj (2012) explored the impact of online environments on consumer decision-making in his study, "Consumer Decision Making on the Web: A Theoretical Analysis and Research Guidelines." The research aimed to determine whether certain features of online shopping environments enable consumers to make higher-quality decisions. Punj conducted a cross-disciplinary theoretical analysis incorporating economic factors (such as time costs), computational elements (like recommendation systems), and psychological aspects (such as decision-making strategies). The study is significant for its theoretical contributions, particularly in understanding how online environments influence consumer decision-making capabilities.

a) The Impact of Personalized Digital Marketing Campaigns on Consumer Perceptions

In contemporary digital marketing, personalization has become a defining feature, enabling brands to tailor their messages and offers to individual customers. Targeted digital marketing initiatives can significantly influence consumer behavior and attitudes (Bognar et al., 2019). By analyzing consumer data and tracking online activities, businesses can deliver information and recommendations that are specifically aligned with each customer's preferences. This tailored approach has proven to be an effective catalyst for altering consumer attitudes and purchasing behaviors.

When creating personalized experiences, it is important to consider customers' unique tastes and interests. By offering content that resonates personally, businesses can enhance the relevance of their messaging, which can make customers feel valued and strengthen their loyalty to the brand (Karampela et al., 2020). However, the dual nature of personalization must be acknowledged. While targeted advertising can positively impact sales, excessive customization can raise concerns about privacy and security.

According to Torkamaan et al. (2019), consumers appreciate personalized recommendations but may be uncomfortable with the extensive monitoring and analysis of their online behavior. Effective personalized digital marketing strategies must balance customization with privacy considerations to be successful. The impact of these campaigns on consumer attitudes and decisions depends not only on the precision of the personalization but also on consumers' confidence in the protection of their data and privacy.

III. Research Methodology

a) Research Philosophy: Interpretivism

Interpretivism focuses on understanding social processes through the subjective experiences and perspectives of individuals (Mohajan, 2018). In this study, the interpretivist approach was employed to gain insights into how customers respond to digital marketing strategies. By exploring their personal experiences and impressions, the research aimed to provide a deeper understanding of customer reactions.

b) Research Design: Explanatory

Explanatory research design aims to analyze and establish causal relationships while elucidating phenomena (Pandey & Pandey, 2021). This study utilized an explanatory design to investigate the effects of digital marketing on consumer behavior. It involved a systematic approach to uncovering the mechanisms and reasons behind how digital marketing strategies impact consumer behavior.

c) Research Approach: Deductive

The deductive approach is used to formulate and test hypotheses or theories about a research topic (Snyder, 2019). This research applied a deductive method to analyze the effects of digital marketing on consumer behavior. By leveraging existing theories and concepts, the study aimed to determine how digital marketing strategies influence consumer behavior based on these theoretical frameworks.

IV. Data Analysis and Findings

a) Impact of Social Media Advertising and Content Marketing on Consumer Engagement

The research underscores the significant role of content marketing and social media advertising in shaping consumer behavior. A robust social media presence can substantially influence customer habits and retention rates (Rosário & Raimundo, 2021).

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Effective strategies that foster a sense of belonging and deliver a superior user experience can enhance brand loyalty and encourage additional purchases (Krizanova et al., 2019). Engaging with customers on social media helps build genuine relationships, making customers more likely to develop positive attitudes toward the brand and seek further interaction (Chung & Byrom, 2021).

b) Role of Personalized Digital Marketing Campaigns in Shaping Consumer Perceptions

Personalized digital marketing campaigns significantly affect consumer perceptions and purchasing intentions. Customizing messages and recommendations based on consumer data and online behavior can create a stronger emotional connection and improve relevance (de Oliveira Santini et al., 2020). This personalization often leads to increased customer loyalty and purchase propensity (Jayasingh, 2019). However, it is crucial to balance personalization with privacy concerns, as excessive surveillance may cause discomfort among consumers (Helme-Guizon & Magnoni, 2019). Transparency about data collection and usage is essential for successful personalized marketing.

c) Influence of Online Reviews, Ratings, and User-Generated Content on Consumer Trust

User-generated content, including reviews and ratings, plays a critical role in shaping consumer trust and influencing purchasing decisions. Customers rely on these reviews for objective and comprehensive evaluations of products and services (Samsøe & Popovic, 2022). Positive reviews and high ratings can enhance consumer confidence, while negative content can undermine trust (Bognar et al., 2019). Effective management of online reviews and active engagement with customer feedback are vital for building credibility and influencing consumer decisions (Karampela et al., 2020). The dynamic nature of online consumer behavior underscores the importance of balancing emotional engagement with privacy and reputation management.

V. Conclusion

This study explores the profound effects of digital marketing on consumer behavior within the ever-evolving online landscape. The research highlights that social media advertising and content marketing play crucial roles in fostering brand loyalty by creating emotional connections and delivering unique user experiences. In the digital age, it is essential for businesses to prioritize content quality and relevance. The findings reveal that personalized digital marketing strategies significantly influence consumer attitudes and behaviors. While personalization can enhance customer relationships and increase the relevance of marketing efforts, companies must exercise caution to respect consumer privacy. Additionally, the study emphasizes the importance of user ratings, reviews, and other forms of user-generated content in shaping consumer trust and purchase decisions. Effective management of these channels is critical, as businesses need to address both positive and negative feedback to maintain credibility and influence consumer opinions.

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Epidemiological Profile of Hypertension on Smokers and Smokeless Tobacco Users among the Male Garment Workers in Dhaka City of Bangladesh

By Dr. Sufi Muhammad Khalid Bin Lutfor

Introduction- *a) Background*: Blood pressure refers to the pressure inside the arteries. Hypertension means that the blood is exerting more pressure than in normal. Over time, this weakens and damages blood vessel walls. Hypertension may also cause thickening of the artery walls, resulting in narrowing and eventual blockage of the vessel. In atherosclerosis, the pressure of pumping blood could 'hose off' debris from damaged artery walls.

Smoking has been shown to raise blood pressure by vasoconstriction and accelerated heart rate as acute effect. Different groups have reported that no association existed between smoking habit and blood pressure. One group found that blood pressure of smokers was lower than that of non-smokers 4 or that smoking raises blood pressure.

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Dr. Sufi Muhammad Khalid Bin Lutfor

I. Introduction

a) Background

Blood pressure refers to the pressure inside the arteries. Hypertension means that the blood is exerting more pressure than in normal. Over time, this weakens and damages blood vessel walls. Hypertension may also cause thickening of the artery walls, resulting in narrowing and eventual blockage of the vessel. In atherosclerosis, the pressure of pumping blood could 'hose off' debris from damaged artery walls.[1]

Smoking has been shown to raise blood pressure by vasoconstriction and accelerated heart rate as acute effect.[2] Different groups have reported that no association existed between smoking habit and blood pressure.[3] One group found that blood pressure of smokers was lower than that of non-smokers [4] or that smoking raises blood pressure.[5]

However, in one study, smokers were found to have stage 1 hypertension as against of non smoker, 38 percent of smokers and 44 percent of non-smoker were pre-hypertensive (subjects with systolic blood pressure 120-139mm/Hg and diastolic blood pressure 80-89mm/Hg) [6] . The nicotine in cigarettes and the lack of oxygen to the body's tissues causes blood vessels to thin. Smoking makes the body unable to circulate blood properly, which in turn causes high blood pressure. The carbon monoxide from smoking cigarettes causes cholesterol deposits to form on the arterial walls. Blood clots become more likely because of the nicotine.[7]

Nicotine raises blood pressure by constricting blood vessels. This occurs because the oxygen in blood decreases and because nicotine directly stimulates the production of a hormone, epinephrine (also known as adrenaline), in the adrenal gland. Epinephrine raises blood pressure by constricting blood vessels.[8]

Worldwide, approximately 1 billion people addicted to cigarette.[9] In developed countries 35% of men and 22% of women smoke, while in developing countries 50% of men 9% of women are smokers.[10] In 2003, the smoking prevalence in our country, among adult was 54.8% in males and 16.6% in females. The prevalence of smoking in age group 18-29,30-39,40-49 is respectively 36.3, 64.2 ,70.8%.[11]

Every year a man smokes a pack a day, he shortens his life by almost 2 months. Even 1 stick of cigarette can reduce life span of a man about 11minutes.[12] Data from large prospective studies of population in several countries have shown that cigarette smoking men have 70 percent higher overall death rates than non-smokers. The effect of mortality is proportionately greatest in younger age group.[13]

Smokeless tobacco use is a significant part of the overall world tobacco problem. Unlike cigarettes and other forms of tobacco, smokeless tobacco is consumed without combustion (without burning). Instead, it is placed in contact with mucous membranes in the mouth or nose, through which nicotine is absorbed into the body. The use of nasal snuff is returning. Different forms of snuff, such as loose or packed snuff, are used by placing in the mouth. Tobacco may also be prepared in blocks and flakes for chewing. In North America, smokeless tobacco use typically consists of the oral use of snuff (moist or dry). In Central, South and Southeast Asia, smokeless tobacco is usually chewed with another substance, such as ash, lime, cotton, sesame or betel quid (a mixture of nut, lime, and leaves).[14-16] Smokeless tobacco is a harmful tobacco product that contains over 3,000 chemicals, 7 including 28 known carcinogens (cancer-causing agents).[17] Smokeless tobacco affects the cardiovascular system and is associated with heart disease, stroke and high blood pressure.[18-27]

Like cigarettes, smokeless tobacco contains nicotine, and nicotine affects the heart. It is not surprising, then, that studies have found that smokeless tobacco increases heart rate and blood pressure,[19,23-27] and puts users at increased risk for stroke, coronary heart disease, peripheral vascular disease (that is, diseases of the arteries and veins) and cardiovascular death.[18,20,22] However, it should be noted that some

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studies have shown no relation between smokeless tobacco use and stroke or cardiovascular mortality.[28,29] Further rigorous studies are needed to determine more clearly the cardiovascular risks potentially associated with smokeless tobacco use.[30,31]

During last decade the garment sector gave Bangladesh and her workers an image boost, both in South Asia and the rest of the world. Currently, Bangladesh exports 35 types of garment products to about 31 countries around the world. It is seen that RMG export earning is very significant and continue to increase. Bangladesh maintained its position as the sixth largest exporter of apparel to the United States during 1994-97. It was the largest exporter of T shirts and shirts to the European Union in 1992 and 1993.[78]

Results of several studies have shown that for a long time, garment workers' health has been viewed within a narrow prospective. However, this has been largely overlooked both by researchers and policy-makers. Health and productivity is highly correlated. The better the health of a worker the higher is productivity. Thus, good health is of much importance to them. But in most cases policymakers and researchers are not aware of how workers health is affected by their work. This awareness is important.

b) Justification of the Study

Smoking is harmful for health is well known. Smoking causes death is printed over the cigarette packet as caution note. In Bangladesh, anti-smoking law was launched by government in June 2005. In spite of the anti-smoking law, smoking is a common problem in Bangladesh and also a major health problem associated with morbidity and mortality. Active smoker are not only harming their health but also making a fatal threat towards the innocent people by exposing them to passive cigarette smoking.[46]

Smokeless tobacco, also called spit tobacco, chewing tobacco, chew, chaw, dip, plug, and probably a few other things, comes in two forms: snuff and chewing tobacco. Regardless of the differences between smokeless tobacco products, they all contain nicotine, a highly addictive chemical, and cause equivalent nicotine levels in the blood as smoking cigarettes. Smokeless tobacco products are as addictive as cigarettes and can cause the same type of dependence, which makes quitting smokeless tobacco very difficult. Furthermore, nicotine may factor into coronary artery disease, peripheral vascular disease, hypertension, peptic ulcer disease, and foetal effects.[50]

A considerable number of garment factories have been established in our country, providing opportunity for employment from different corners of the country mainly from lower socio-economic groups. Workers of the garments factory have their own routine style of living, belief, channel of command and supervision. A research in respect of health status of the workers in this new discipline will provide us knowledge about health of the specific group of workers.[77]

So the present study was to find out the prevalence of hypertension on tobacco users. The findings, discussions and recommendations of this study will form a basis for dissemination of knowledge on the subject and area of ignorance will stimulate further research for socio-economic development through production of healthy workers. It will help to collect and disseminate data (Health information) to Govt., NGO's, Public Health Institute, Research Organization, etc. It will give information to develop health care policy and guideline, define priority intervention area of health. And also recognize health care service and plan public health strategies.

Several studies in other countries have shown the hazardous effect of smoking and smokeless tobacco as change of blood pressure. But there is not any study found in Bangladesh on this issue. So the present study will be done to see the prevalence of hypertension among tobacco users.

c) Operational Definitions of Terms

- *Age:* Calculated in year, up to one character after decimal (1 year means 1.0 to 1.9 year) from date of birth mentioned by the patients.
- *Educational Status:*

Illiterate: It includes all the men who could not read or write and only could read or write and only could sign their name.

Primary: It includes all the men who had read up to or completed the class from one to five.

Secondary: It includes all the men who had read up to or completed the class from six to S.S.C.

Higher education: It includes all the men who at least completed their bachelor degree.

- *Tobacco:* Any product of tobacco leaf of any origin, may be in the form of Cigarettes, Pipes. Hukka.
- *Smokeless tobacco:* Tobacco preparations without producing smoke. smokeless tobacco chewing, tobacco leaf with betel quid ('Pan').
- *Frequency of smoking:* For cigarettes and bidi (biri) the frequency of tobacco smoking is noted from number of sticks smoked per day. In case of hukka the frequency is noted from how many times one smokes per day.
- *Smokeless Tobacco Users:* In the present study, smokeless tobacco users are that subjects who have used any form of smokeless tobacco product for last 5 years or more.
- *Smoker:* In this study, smokers are those subjects, who smoke cigarette, ten or more per day, regularly for last five years or more.

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- *Blood Pressure Parameters:* In this study, BP parameters are mainly systolic (110—140 mm Hg) and diastolic (60—90 mm Hg) blood pressure.
- *Hypertension:* High blood pressure is said to be present if it is persistently at or above 140/90 mmHg.
- *Hypotension:* Hypotension is generally considered to be systolic blood pressure less than 90 mm Hg or diastolic less than 60 mm Hg.

d) Research Question

What is the epidemiological profile of hypertension on smokers and smokeless tobacco users among the male garment workers in Dhaka city of Bangladesh?

II. Review of Related Literature

The readymade garment (RMG) is a key sector of Bangladesh economy. The garment industry of Bangladesh has been expanding rapidly since late 1970. During 1977-78 only about one lakh taka was earned by exporting garment, while the figure raised to taka one core by 1980. In 1989-90 the industry earned 624.16 million dollars. The export earning was 3781.94 million dollars during 1997-98 i.e. about 73.28 percent of the total export earnings. Jute was once the main export earner for Bangladesh, accounting for 75 percent of the total earnings in 1978; garments have however increasingly replaced this. Garment is now the largest export earner in Bangladesh. But only 25-30 percent of garment export is value-added, since the fabrics and accessories are imported under a back to back arrangement.[79]

As a formal export-oriented industry, the manufacturing of garments emerged as a tiny scale in Dhaka city in 19766-77. By 1983, only 47 garment manufacturing units were established. The number of garment industries doubled in the mid-1980s with an influx of foreign investments. By 1987, the garment industry was the leading export sector. New garment factories were set up in Dhaka, and in other cities like Chittagong and Khulna. The total number of garment industries rose to 2500 units in 1996, employing some one million workers. The Bangladesh garment industry has now flourished as one of the major exporters of ready-made garments in the world market.[80]

In 1996, Bangladesh exported garments worth US$2.5 billion to the US and other export markets. The US has almost half of the export market for garments and the rest are made up of Germany, France, Italy, UK, Netherlands, Canada and so on.[80]

The garments of Bangladesh are increasingly becoming visible in the markets of developed countries. For example, Bangladesh was the 9th supplier in 1998 to the US market having a market share of 3 percent. For the cotton garments, Bangladesh was the 4th supplier having a market share of 5 percent. Beside the US, Bangladesh also supplies ready-made garments to the European Community (EC) market and Canada.[81]

Garment industry not only accounts for the lion share of export earnings of the country, but also accounts of the employment. In terms of employment the garment industry was the fourth largest employing sector in 1998. According to BGMEA about 1,500,000 workers were employed in about 2800 garment industries.[81]

Zahir and Majumder on their study regarding the incidence of illness found that 54 percent of the workers had fairly good health before undertaking employment in the garment factory. But this figure came down only 12 percent after they joined the garment factory. Work day's loss due to an illness a yardstick to measure the extent of adverse health impact of wage employment on garment workers. About 46 percent of workers had to take leave for some unavoidable reasons of which illness is one of dominant case.[82]

Hypertension may be primary, which may develop as a result of environmental or genetic causes, or secondary, which has multiple aetiologies, including renal, vascular, and endocrine causes. Primary or essential hypertension accounts for 90-95% of adult cases, and a small percentage of patients (2-10%) have a secondary cause.[88]

Hypertension develops secondary to environmental factors, as well as multiple genes, whose inheritance appears to be complex.[83-84] Furthermore, obesity, diabetes, and heart disease also have genetic components and contribute to hypertension. Epidemiological studies using twin data and data from Framingham Heart Study families reveal that blood pressure has a substantial heritable component, ranging from 33-57%.[85,86,87]

Smoking is a process of dry distillation during which the nicotine is partially destroyed at the burning tip of the cigarette or cigar. Part of the nicotine is vaporized, some of the vapour being condensed in the cooler proximal part of the cigarette. The smoke inhaled through a cigarette, for instance, is called the main stream, and that rising from the burning tip between puffs is called the side stream.[32]The literary meaning of 'Ciker' is 'smoking'. Cigero has been derived from 'Ciker' and this cigero is modified into cigarette in France. The word cigarette was derived from Spanish word "cigar" — a rolled tobacco leaf. Cigarette is the most popular and commonest form of tobacco consumption throughout the world.[33]

Tobacco smoking is the act of smoking tobacco products especially cigarettes and cigars.[34] Passive smoking is inhalation of environmental second hand tobacco smoke. Involuntary or second hand smoke occurs when the exhaled and ambient smoke from a person's cigarettes is inhaled by other people.[35] Non-smoker means a person who never smoked cigarette as any kind of tobacco products.[36] Smoking cessation is

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who stopped smoking. It is possible to reduce the risk by reducing the frequency of smoking.[34]

The word 'tobacco' has originated from the word 'tube' or a cylindrical pipe, made out of a rectangular piece of a leaf used for packing tobacco for the purpose of inhaling its smoke conveniently. Tobacco, a rapidly growing leafs plant was originally cultivated in the primitive colonies of America from time immemorial. Tobacco was not known to the old world till the first quarter of the 16th century. The entry of the tobacco plant into the old world is linked with the expedition of Columbus to America. When he landed in America in 1642, he was offered dried tobacco leave. The use of tobacco leaf to create and satisfy nicotine addiction was introduced to Columbus by Native Americans and spread rapidly to Europe.[37]

In 1612 the British colony at Jamestown, Virginia, began growing wild tobacco and exporting it to England. They soon switched to common tobacco in West Indies and Europe. The Arawak people smoked tobacco through a tube they called a Tobago, from which the name tobacco originated. In about 1864 an Ohio farmer happened upon a chlorophyll deficient strain of tobacco called white burley, which become a main ingredient at American blended tobaccos.[38]

Currently, there are an estimated 1.3 billion smokers in the world. The death toll from tobacco consumption is now 4.9 million people a year; if present consumption patterns continue, the number of deaths will increase to 10 million by the year 2020, 70% of which will occur in developing countries.[39]

There are various forms of smoking such as tobacco, cannabis, hashish and cocaine. Main sources of tobacco use in Bangladesh are cigarette, biri, hukka, chew tobacco, pan-masala etc. Among these cigarette is the second highest prevalence. Biris are especially popular by the rural and lower income groups.[40]

Bangladesh is one of the high tobacco consuming countries. Tobacco is mainly smoked in the form of Cigarette, Biri, cigar, pipe, hukka in our country. In addition to high smoking rate, Bangladesh people use smokeless tobacco, such as zarda, sada pata, panmasala, and gui.[39]

About 130 million people in Bangladesh are tobacco smokers which cost them 13.43 billion taka per year. A study in Jaydebpur revealed that 71% male & 20% female do smoke regularly. Out of them 42% was suffering from various diseases, 41% among them are respiratory related illness.[41]

Tobacco is one of the main agricultural products of Bangladesh and ranks fourth after jute, sugarcane and tea.[42] According to WHO report on Bangladesh, agriculture in 1993, [44] 192 hectares were harvested for tobacco. 0.5% of all arable land is used for tobacco growing. In 1992, Bangladesh produced about 75,000 million manufactured cigarettes and biris (about 1.3% of world total). Industries in 1993, about 131,000 people were employed full time in tobacco leaf processing and tobacco manufacturing, wholesaling and retailing occupations. About 2, 04,500 people are engaged full time in farming tobacco.[43]

In 2003, the smoking prevalence in Bangladesh, among adults was 54.8% in males and 16.6% in females. The prevalence of smoking in age group 18-29, 3 0-39, 40-49 is respectively 36.3, 64.2, and 70.8%. [44]

Unburned tobacco contains nicotine. When it is burned the resultant smoke contains, in addition to nicotine, carbon monoxide and 4000 other compounds that results from volatilization. The smoke is composed of a fine aerosol, with particle size distribution predominantly in the range to deposit in the airways and alveolar surface of the lungs. Which contains a large number of toxic constituents and carcinogen compounds.[45]

Smoking harms nearly every organ of the body; causing many diseases and reducing the health of smokers in general. The adverse health effects from cigarette smoking account for an estimated 438,000 deaths, or nearly 1 of every 5 deaths, each year in the United States. More deaths are caused each year by tobacco use than by all deaths from human immunodeficiency virus, illegal drug use, alcohol use, motor vehicle injuries, suicides, and murders combined.[46, 47]

Smoking has several health effects such as coronary heart disease, abdominal aortic aneurysm, bronchitis, lung cancer, cancer of pharynx, cancer of oral cavity. [89, 90] Also smoking has many adverse reproductive and early childhood effects, including increased risk for—Infertility, Preterm delivery, Stillbirth, Low birth weight, Sudden infant death syndrome (SIDS).[91]

Smokeless tobacco has been around for a long time. Native people of North and South America chewed tobacco, and snorting and chewing snuff was popular in Europe and Scandinavia (the word "snuff" comes from the Scandinavian word "snus").[48]

A comparison is often made between the smokeless tobacco products in Sweden and those in the U.S. However, smokeless tobacco products sold in Sweden are manufactured according to Sweden's laws governing food and must meet additional industry established quality indicators (known as the Gothiatek System [50])involving ingredients and measurements for harmful elements such as tobacco specific nitrosamines (TSNAs) and other toxins and carcinogens. Products that have been subjected to this process have been found to be lower in TSNA levels (e.g., some Swedish brands have been found to possess only 2 percent of the TSNA levels of their U.S. counterparts) and maintain these low levels over time.[51] In contrast, products sold in the U.S. have no uniform manufacturing code, are not regulated, and contain significantly higher levels of carcinogenic substances, including TSNAs, which,

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unlike their Swedish counterparts, have been found to increase over time.[52] As a result, U.S. smokeless tobacco products have been found to pose serious health risks and are a known cause of cancer.[53] On the other end of the spectrum, in India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Thailand, the Lao People's Republic, Cambodia, the Philippines, and Palau, smokeless tobacco products such as betel quid with tobacco, areca nut with tobacco, or gutka had significantly higher rates of oral, pharyngeal, and oesophageal cancers. People who chewed betel quid with tobacco also showed higher prevalence of leukoplakia.[54]

Studies are inconclusive as to how significantly smokeless tobacco affects users' cardiovascular systems, but it has been studied that it may have more nicotine than cigarettes. One study states that, "Although the evidence is not conclusive, the adverse cardiovascular effects of smokeless tobacco use are less than those caused by smoking but are more than those found in non-users."[55] Other studies also indicate that smokeless tobacco related cardiovascular risks are lower than that of smoked tobacco.[56, 57] One study states that smokeless tobacco use has a "positive effect on cardiovascular risk factors in young physically fit men."[58] However, it is important to note that one Indian study from the state of Rajasthan states, "There is a significantly greater prevalence of multiple cardiovascular risk factors [sic] obesity, resting tachycardia, hypertension, high total and LDL cholesterol, and low HDL cholesterol, and electrocardiographic changes in tobacco users, chewing or smoking, as compared-to tobacco non-users. Chewing tobacco is associated with similar cardiovascular risk as smoking."[59] This finding may bear on the possibility that smokeless tobacco in India is produced differently than in Western countries. Due to contrasting results in studies, many conclude that further research should be done on the cardiovascular risks of smokeless tobacco.[60, 61]

Smokeless tobacco contains nicotine, which is the primary reinforcing agent. According to European Union policy, Scandinavian or some American smokeless tobaccos are at least 90% less hazardous than cigarette smoking.[62] However, the habit is still addictive.

Taxation and restriction of smoking is causing more smokeless tobacco use as "substitution." There are active public health debates regarding risk-reduction for smokers and the reconsideration of smokeless tobacco risks. "There is a substantial body of informed and independent opinion that sees the value of harm reduction strategies based on smokeless tobacco."[63] Most of these studies are supported by the makers of smokeless tobacco.

Smokeless tobacco is addictive and harmful. Some tobacco control strategists nonetheless believe that encouraging a shift toward smokeless tobacco use can be an effective harm reduction approach on the basis that these products may reduce total tobacco-caused death and disease despite exposing users to potentially harmful constituents.[66] WHO's Scientific Advisory Committee on Tobacco Products Regulation raises a cautionary note in this regard. In the committee's assessment, current evidence does not indicate that use of any smokeless tobacco is free of health risks. They conclude that there is no evidence to support any claims that suggest smokeless tobacco is free of health risks.[67]The relationship between smokeless tobacco use and smoking is difficult to ascertain. Though some studies find that smokeless tobacco use is more likely to precede smoking, [68, 69] it is more commonly found that smoking precedes smokeless tobacco use.[70]

Although some people may use snuff to quit smoking, a study showed that U.S. men more commonly switch from snuff use to smoking. There is evidence that snuff may serve as a supplemental source of nicotine for some male current smokers. Nearly half of men who used snuff on some days were current smokers, and those who currently smoked only on some days were more likely than never smokers to be current snuff users. Male smokers who used snuff every day smoked, on average, fewer cigarettes per day, again suggesting that snuff may serve as a supplementary source of nicotine. Also, smokers who also use snuff are more likely than non-users of snuff to try to quit smoking but tend to be less successful.[68]Given these uncertainties, other strategists take the view that, regardless of the specific levels of harm caused by smokeless tobacco products, their overall inherent risks do not support smokeless tobacco as a viable harm reduction strategy. The major concern about promoting one tobacco product as less harmful than another is that it may undermine efforts to achieve total tobacco-product cessation or may foster smoking initiation among people who otherwise would not have started.[68]

Dentists and dental hygienists are trained to detect oral lesions and periodontal problems that are related to tobacco use. It is thus appropriate for them to help prevent the initiation of tobacco use by children and adolescents through the use of positive anti-tobacco messages. Over the past decade, tobacco cessation strategies have been modified for practical use in dental settings. A study reviewed several brief interventions by dental professionals to encourage the cessation of smokeless tobacco use: oral cancer screening, cessation advice, self-help materials, and brief cessation counselling by a dental hygienist. This study found that oral screening and brief cessation counselling by dental professionals in the dental office or in athletic facilities were effective in promoting cessation of smokeless tobacco use. Furthermore, a 2006 review showed that behavioural interventions

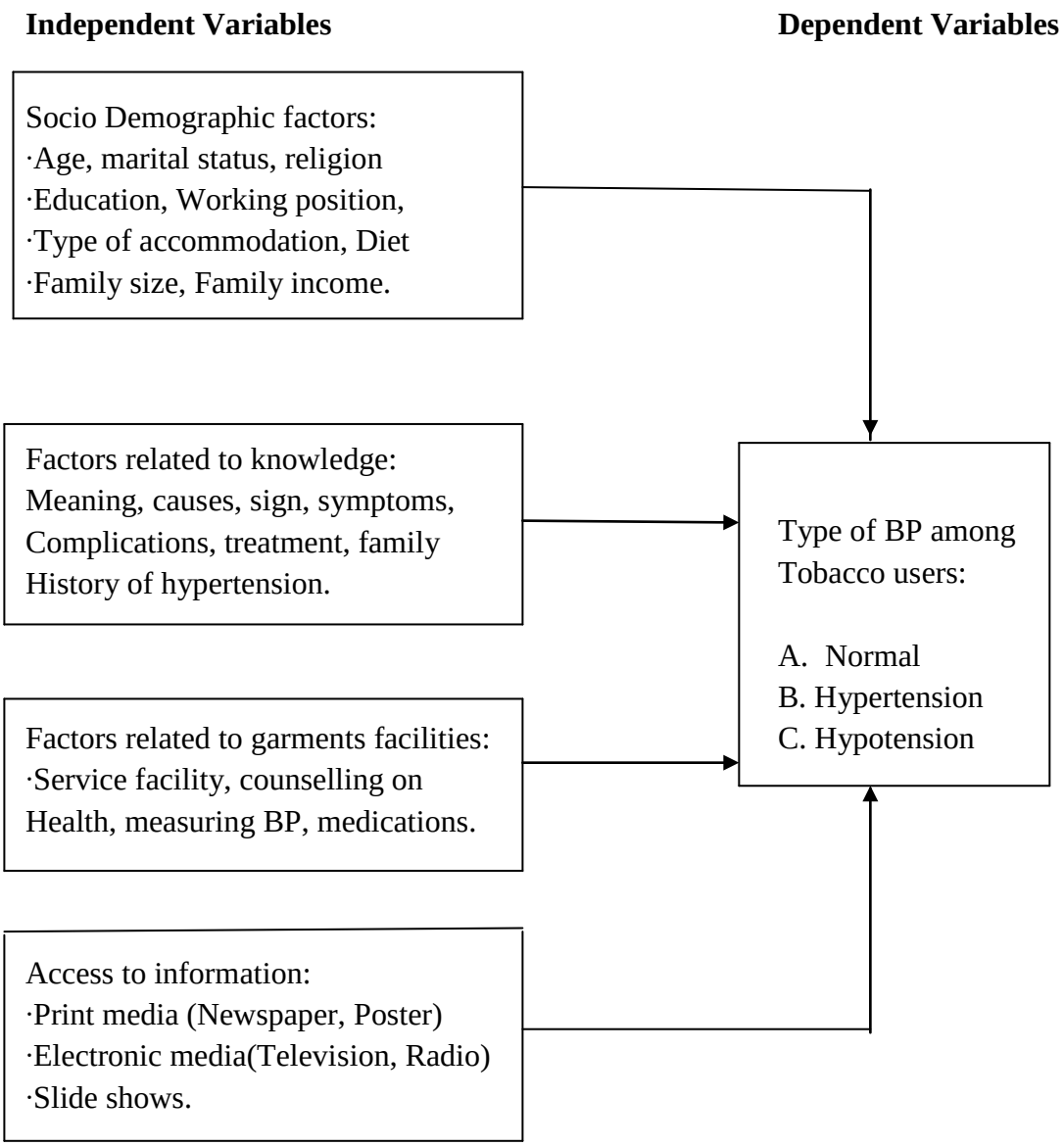
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conducted by oral health professionals improved rates of cessation of smokeless tobacco use. Incorporating oral assessments and behavioural interventions in dental practices may encourage cessation of smokeless tobacco use.[71]

In a 2004 review of several studies examining cessation of smokeless tobacco use, there was no indication of benefits of using pharmacotherapy including bupropion, a nicotine patch, or nicotine gum. However, it was suggested that larger trials investigating pharmacotherapy are needed. Research in the area of smokeless tobacco cessation is limited but seems to suggest that a combination of therapies offers the greatest hope for success.[72]

Considering that smokeless tobacco products still contain varying levels and types of carcinogens [73] and cause other types of health risks compared to cigarettes, the only way to reduce an individual tobacco users health risks to the maximum extent possible is to quit using tobacco entirely with evidence-based treatments that have been scientifically documented to help people quit using tobacco (e.g., nicotine gum and patch, telephone-based behavioural counselling/ quit lines).[74] Smokeless tobacco use during youth can lead to a lifetime of addiction to smokeless tobacco or, frequently, to cigarettes, as the nicotine addiction created by smokeless use ultimately leads to habitual smoking.[75] Evidence shows that adolescent boys who use smokeless tobacco products have a higher risk of becoming cigarette smokers within four years.[76]

a) Conceptual framework



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General Objective

To explore epidemiological profile of hypertension on the smokers and smokeless tobacco users of male garment workers in Dhaka city of Bangladesh.

Specific Objectives

1. To describe the socio demographic factors among the smokers and smokeless tobacco users of male garment workers in Dhaka city of Bangladesh.
2. To assess the level of knowledge on hypertension of male garment workers.
3. To assess the educational needs to improve their awareness of hypertension on male garment workers.
4. To explore the parameters of hypertension among the male garment workers.
5. To assess the access to information on male garment workers.

Study Design

It was done descriptive type of cross-sectional study among the male garment workers.

Study Area

The study was carried out in Level I clinic, Civil Engineers' Tower, Standard Group, Kalshi, Mirpur-11, Dhaka.

The reason for selecting this place was:

Easy communication

Assurance of all positive help and co-operation by the authority.

A good number of study subjects were available at a time.

Study period

The study was done within the time period of September to October 2013.

Study Population

The respondents of the study were the smoker and smokeless tobacco users.

Eligible Criteria

a) Inclusion Criteria

Participants who meet the criteria were included in the study:

1. Adult male smokers.
2. Adult male smokeless tobacco users.
3. Smokers smoking ten or more cigarettes per day for more than 5 years.
4. Smokeless tobacco users using any form of smokeless tobacco for more
a. than 5 Years
5. Age: Over 18 years
6. Sex: Male

b) Exclusion Criteria

Participants that were excluded from the study:

1. Person who could not give history properly.
2. Unwilling to take part in study after the verbal consent process.
3. Those that was not co-operative.

Sample Size Determination:

The sample size was determined by following formula

$$n = \frac{z^2 p q}{d^2}$$

Where,

n = the desired sample size which would help to measure the different indicators

z = the standard normal deviate, usually set at 1.96 at 5% level which corresponds to 95% confidence level.

The assumed target proportion is p to have a particular characteristics and q=1-p, Here p=0.5

Putting the values in the above equation the sample size n is estimates as

$$\frac{3.84 \times 0.5 \times 0.5}{0.05^2}$$

n=384 (targeted sample size)

Sample Size

The present study has been designed to measure blood pressure among adult male smoker and smokeless tobacco users. For the academic purpose and time limitation 105 patients of over 18 years were selected from outdoor medicine units of level-I clinic from Standard Group's garment, Dhaka.

Sampling Technique

Purposive sampling (all smoker and smokeless tobacco user attended at outdoor medicine units of Level-I clinic of Standard Groups Kalshi factory.).
105 patient from the selected tertiary clinic from above mentioned study place during the study period and who fulfilled the inclusion and exclusion criteria were included in the study. The subjects were selected purposively.

The patients were grouped as follows:

Group A: Consisted of 30 adult smokeless tobacco users.
Group B: Consisted of 75 adult –smokers.

Data Collection Tool

- Semi-structured Questionnaire and check list.
- Semi-structured questionnaire was used as a tool for collection of data.

Data Collection Technique

The self-report technique was adopted as the data collection technique. The research ethical committee of Public Health Department, North South

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University giving ethical clearance of the study that followed by permission of Managing Director and Chief Medical Officer of Standard Group. The data collection should be carried out from 15th September to 15th October, 2013. Total 105 individuals participated in the research and none of them withdrew their consent from the study.

Questionnaire was translated into Bengali language for data collection by face to face interview. Blood pressure measurement was carried out by researcher himself with the help of check list.

Data Processing

After collection data should be cleared, coded and categorized. Then the Master Tabulation Sheet should prepare after proper checking, verifying and editing as per specific objective and key variables.

Data Analysis

Statistical analyses of the results should be obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-15). During analysis frequency distribution of variables should worked out and produced in tabular form. Results of statistical analysis between the groups would be calculated by using unpaire 't' test.

Ethical Consideration

- Ethical clearance
- Permission of Managing Director and Chief Medical Officer of Standard Group.
- Consent of the individual patients
- Privacy and confidentiality
- Data only used for this research.

Limitations of the Study

Despite all efforts there should be some limitations of the study. Community based study unusually bear some limitations. The limitations are as follows:

a) Only men are included. So the estimated values of variables in this study of male smokers and smokeless tobacco users cannot be generalized to females.
b) The sample size is small. So the result obtained from the study may not be generalized.
c) The study place is an outdoor of level-I clinic. So the result may be different from the indoor department. The validity of the result is applicable in this particular situation.
d) The study should be based only on interview records; no scope of observational checks is there. So there may not be sound reflection.

Expected Outcomes

This study will estimate status of hypertension in smoker and smokeless tobacco user and will reveal the influencing of blood pressure among the garment workers. Thus it may help to reduce the effect of hypertension on smoker and smokeless tobacco user in future and they will lead a healthy life.

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Tips for writing a good quality Medical Research Paper

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



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6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

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Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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