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## Symptoms of Stress and Quality of Life of Basic Education Teachers

By Ricelli Endrigo Ruppel da Rocha, Fábio Pitanga & Diego André Bridi

UNIARP

**Abstract-** This study analyzed stress symptoms and quality of life among basic education teachers. A total of 176 teachers from preschool, primary, and secondary education in municipal and state schools participated in the research. The frequency, phase, and symptoms of stress were assessed using the Lipp Stress Symptoms Questionnaire, along with the perception of quality of life using the WHOQOL-BREF questionnaire. 48.9% of the teachers manifested some level of stress, mainly in the resistance phase (73.2%) and near-exhaustion phase (26.8%). Psychological symptoms predominated over physical ones ( $p < 0.0001$ ). The median scores for the Physical (55.5) and Environment (56.3) domains were significantly lower ( $p < 0.01$ ) than the Psychological (62.5) and Social Relationships (66.7) domains. The overall quality of life score of 59.3 points classified the teachers as dissatisfied with their quality of life. In summary, psychological symptoms impact teachers' stress levels, and the quality of life falls short of desired levels.

**Keywords:** teachers. stress. teaching. wellness.

**GJHSS-H Classification:** LCC: LB1775



SYMPTOMS OF STRESS AND QUALITY OF LIFE OF BASIC EDUCATION TEACHERS

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# Symptoms of Stress and Quality of Life of Basic Education Teachers

Sintomas de Estresse e Qualidade de Vida de Professoras da Educação Básica

Síntomas de Estrés y Calidad de Vida de Profesoras de Educación Básica

Ricelli Endrigo Ruppel da Rocha <sup>α</sup>, Fábio Pitanga <sup>σ</sup> & Diego André Bridi <sup>ρ</sup>

**Resumo-** Este estudo analisou os sintomas de estresse e a qualidade de vida de professoras da educação básica. Participaram da pesquisa 176 professoras do ensino infantil, fundamental e médio de escolas municipais e estaduais. Foram avaliadas a frequência, fase e sintomas de estresse (Questionário dos Sintomas de Stress de Lipp) e a percepção da qualidade de vida (Questionário WHOQOL-BREF). Manifestaram algum nível de estresse 48,9% das professoras, principalmente na fase de resistência (73,2%) e quase-exaustão (26,8%). Os sintomas psicológicos predominaram sobre os físicos ( $p < 0,0001$ ). Os escores das medianas dos domínios Físico (55,5) e Meio Ambiente (56,3) foram significativamente menores ( $p < 0,01$ ) que os domínios Psicológico (62,5) e Relações Sociais (66,7). O escore da qualidade de vida geral de 59,3 pontos classificou as professoras como insatisfeitas com a sua qualidade de vida. Em resumo, os sintomas psicológicos impactam no estresse das professoras e a qualidade de vida está aquém do desejado.

**Palavras-Chave:** docentes. stress. ensino. bem-estar.

**Resumen-** Este estudio analizó los síntomas de estrés y la calidad de vida entre los docentes de educación básica. Un total de 176 profesores de educación preescolar, primaria y secundaria en escuelas municipales y estatales participaron en la investigación. La frecuencia, fase y síntomas de estrés se evaluaron mediante el Lipp Stress Symptoms Questionnaire, junto con la percepción de la calidad de vida mediante el cuestionario WHOQOL-BREF. El 48,9% de los profesores manifestaron cierto nivel de estrés, principalmente en la fase de resistencia (73,2%) y en la fase de casi agotamiento (26,8%). Los síntomas psicológicos predominaron sobre los físicos ( $p < 0,0001$ ). La mediana de las puntuaciones para los dominios Físico (55,5) y Ambiente (56,3) fue significativamente menor ( $p < 0,01$ ) que los dominios Psicológico (62,5) y Relaciones Sociales (66,7). El puntaje general de calidad de vida de 59,3 puntos clasificó a los docentes como insatisfechos con su calidad de vida.

**Palabras Clave:** docentes. stress. enseñando. bienestar.

**Abstract-** This study analyzed stress symptoms and quality of life among basic education teachers. A total of 176 teachers from preschool, primary, and secondary education in municipal and state schools participated in the research. The

frequency, phase, and symptoms of stress were assessed using the Lipp Stress Symptoms Questionnaire, along with the perception of quality of life using the WHOQOL-BREF questionnaire. 48.9% of the teachers manifested some level of stress, mainly in the resistance phase (73.2%) and near-exhaustion phase (26.8%). Psychological symptoms predominated over physical ones ( $p < 0.0001$ ). The median scores for the Physical (55.5) and Environment (56.3) domains were significantly lower ( $p < 0.01$ ) than the Psychological (62.5) and Social Relationships (66.7) domains. The overall quality of life score of 59.3 points classified the teachers as dissatisfied with their quality of life. In summary, psychological symptoms impact teachers' stress levels, and the quality of life falls short of desired levels.

**Keywords:** teachers. stress. teaching. wellness.

## 1. INTRODUÇÃO

A profissão de docente é reconhecida como uma das mais estressantes e os estudos têm mostrado que a prevalência de estresse na população de professores é alta, alcançando valores de 8,3% à 87,1% (AGYAPONG; OBUOBI-DONKOR; BURBACK; WEI, 2022). Além disso, os professores estão entre as categorias de trabalhadores que mais se afastam, principalmente por transtornos mentais e comportamentais (TAVARES; HONDA, 2021).

A maioria dos professores que atuam na Educação Básica são do gênero feminino e as professoras têm reportado menor percepção de saúde e mais estresse ocupacional comparado aos seus colegas professores (TUOMINEN; MAYOR, 2023). O estresse é uma reação do organismo, com componentes físicos e/ou psicológicos, causada pelas alterações psicofisiológicas que ocorrem quando a pessoa se confronta com uma situação que, de um modo ou de outro, a irrita, amedronta, excita ou confunde, ou mesmo que a faça imensamente feliz (LU; WEI; LI, 2021).

O precursor dos estudos sobre estresse foi Selye (1951) que propôs três fases: a fase de alerta que corresponde à resposta aguda do organismo ao agente estressor visando eliminar seus efeitos; a fase de resistência ocorre quando o agente estressor continua atuando sobre o organismo, estimulando o eixo hipotalâmico-hipofisário-adrenal para eliminar os efeitos

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negativos e recuperar a homeostase e; a fase de exaustão que se caracteriza quando o agente estressor permanece atuando exaurindo o eixo hipotalâmico-hipofisário-adrenal (SELYE, 1936).

Lipp (2000), acrescenta ainda uma quarta fase, denominada de quase exaustão, sendo uma continuidade da fase de resistência. Esta fase é um período de transição que compreende as fases de resistência e exaustão, ciclo em que a pessoa não consegue mais ser capaz de resistir, porém não atingiu a exaustão completa.

As fases de quase exaustão e exaustão do estresse são as que podem trazer maiores consequências para a saúde das professoras, pois as doenças psicossomáticas dos órgãos começam a surgir a partir destas fases, impactando negativamente a qualidade de vida (OLIVEIRA et al., 2015, PEREIRA et al., 2013, SANTOS et al., 2013, GIANNINI et al., 2012; WOTTRICH et al., 2011).. (ZIBETI; PEREIRA, 2010).

A qualidade de vida é uma percepção do indivíduo de sua posição na vida no contexto da cultura e sistema de valores nos quais ele vive e em relação aos seus objetivos, expectativas, padrões e preocupações (WHO, 1998). É um conceito de alcance abrangente, afetado de forma complexa pela saúde física, estado psicológico, nível de independência, relações sociais e relações com as características do meio ambiente do indivíduo (WHO, 1998).

A redução da percepção da qualidade de vida é sinal de diminuição do estado de saúde geral e da capacidade de adaptação do corpo ao estresse físico e mental, aumentando as chances de desenvolver doenças e de se afastarem das atividades ocupacionais (STEPANOVA; USTINOVA; NIKOLAEVA, 2021).

O afastamento do trabalho das professoras por doenças relacionadas ao estresse e a perda da qualidade de vida, afetará a qualidade do ensino e do processo de aprendizagem dos alunos, além de acarretar elevado custo econômico às instituições e à seguridade social, reorganização das instituições para reposição de professores e novas contratações (ROCHA; PRADO FILHO; SILVA; BOSCARI et al., 2017). Os estudos com a população de professoras da educação básica têm focado nos fatores estressores ocupacionais (ARAÚJO; PINHO; MASSON, 2019; CARLOTTO; CÂMARA; DIEHL; ELY et al., 2018; LUZ; PESSA; LUZ; SCHENATTO, 2019), nas condições de vida e saúde (BARBOSA; JESUS; COSTA; SANTOS et al., 2022), síndrome de burnout (GUIDETTI; VIOTTI; BADAGLIACCA; COLOMBO et al., 2019; SMETACKOVA; VIKTOROVA; PAVLAS MARTANOVA; PACHOVA et al., 2019) e distúrbio da voz (FERRACCIU, 2013; MUSA; MOY; WONG, 2018).

Investigações sobre estresse e qualidade de vida em professoras que lecionam na Educação Básica brasileira ainda são necessárias e merecem mais

destaques, pois, conhecer as condições físicas e mentais poderá subsidiar políticas de promoção da saúde e da qualidade de vida no trabalho docente. Diante disso, este estudo teve como objetivo analisar os sintomas de estresse e a percepção da qualidade de vida de professoras da Educação Básica.

## II. MATERIAIS E MÉTODOS

Este estudo descritivo, com abordagem quantitativa e com delineamento transversal, a determinação do tamanho da amostra foi realizada através do cálculo amostral a partir da proposta de Rodrigues (2002) e se baseou de acordo com os dados fornecidos pela Secretaria Municipal de Educação do município de Caçador, Santa Catarina. De um total de 616 professores do gênero feminino, considerando um erro de 5% e uma probabilidade (p) de 50%, através do cálculo amostral o valor obtido foi de 157 professoras, mas a disponibilidade das professoras possibilitou uma amostra total de 176 voluntárias.

Todas as voluntárias atuavam na educação infantil, ensino fundamental e médio das 24 escolas pertencentes a Educação Básica do município de Caçador, localizado no Meio Oeste de Santa Catarina. A pesquisa foi aprovada pelo Comitê de Ética em Pesquisa (CEP) da Universidade Alto Vale do Rio do Peixe, protocolo número 1.255.145.

Para a realização da pesquisa, primeiramente foi solicitado ao secretário da educação do município uma autorização. Logo após, foi realizada uma reunião com todos os diretores das 24 escolas informando sobre os procedimentos da pesquisa e os agendamentos dos horários para os pesquisadores se locomoverem até os locais de coleta dos dados. Nas escolas, as avaliações das professoras foram realizadas em uma sala de aula reservada, determinada pela diretora da escola.

Inicialmente, as professoras foram informadas sobre os objetivos e os procedimentos da pesquisa e somente participaram da pesquisa as professoras que assinaram o termo de consentimento livre e esclarecido (TCLE) e as que não participaram retornaram as suas salas de aulas.

Todas as avaliações aconteceram nos meses de outubro, novembro e início de dezembro, nos períodos matutino e vespertino, durante as aulas. Antes da aplicação dos questionários as professoras, os pesquisadores se reuniram e receberam um treinamento das ferramentas para eliminar possíveis vieses e confusão na interpretação das perguntas. As aplicações de todos os questionários foram realizadas no momento que as professoras estavam reunidas na sala reservada pela diretora nas escolas. Os questionários foram apresentados e aplicados na seguinte ordem: a) Questionário Sociodemográfico e ocupacional; b) Questionário dos Sintomas de Stress

de Lipp (ISSL) e; c) Questionário da Qualidade de Vida (WHOQOL-BREF).

O questionário sociodemográfico e ocupacional foi constituído por 13 perguntas referentes a idade, estado conjugal, número de filhos, escolaridade, prática de atividade física semanal, tabagismo, uso de medicamentos diário, tipo de contrato, tempo de docência, carga horária semanal, turno de trabalho, número de alunos por turma e se houve afastamento do trabalho por problemas de saúde.

Para a avaliação dos sintomas de estresse utilizou-se o Inventário de Sintomas de Estresse para Adultos de Lipp (ISSL, 2000), que avalia se há ou não estresse, bem como seu nível, por meio de um modelo de quatro fases, denominadas alerta, resistência, quase exaustão e exaustão, apontando a predominância de sintomas físicos ou psicológicos, ou ambos. As fases do estresse são descritas da seguinte forma: 1) Fase de Alerta - o organismo é exposto a uma situação de tensão e se prepara para a ação. Algumas reações presentes são taquicardia, tensão muscular e sudorese. Se o agente estressor não é excluído, o organismo passa ao estágio de resistência. 2) Fase de Resistência - o sujeito, automaticamente, utiliza energia adaptativa para se reequilibrar. Quando consegue, os sinais iniciais (das reações bioquímicas) desaparecem e o indivíduo tem a impressão de que melhorou, porém, a sensação de desgaste generalizado, sem causa aparente, e as dificuldades com a memória ocorrem nesse estágio, mas, muitas vezes, não são identificadas pelo indivíduo em situações de estresse excessivo. 3) Fase de Quase Exaustão - o organismo está enfraquecido e não consegue se adaptar ou resistir ao estressor. Nesse estágio, as doenças começam a aparecer, como herpes simples, psoríase, picos de hipertensão e diabetes. 4) Fase de Exaustão - a exaustão psicológica e a física se manifestam, e, em alguns casos, a morte pode ocorrer. As doenças aparecem frequentemente tanto em nível psicológico, em forma de depressão, ansiedade aguda, incapacidade de tomar decisões, vontade de fugir de tudo, como também em nível físico, com alterações orgânicas, hipertensão arterial essencial, úlcera gástrica, psoríase, vitiligo e diabetes.

No ISSL, há instrução sobre o questionário e o preenchimento dos dados de caracterização do sujeito, como sexo, idade, local de trabalho, função exercida e escolaridade. O inventário contém também um total de 53 questões fechadas, divididas em três quadros, sobre os sintomas físicos (34 itens) e psicológicos (19 itens). O primeiro quadro, composto por 12 itens, refere-se aos sintomas físicos e 3 psicológicos que a pessoa tenha experimentado nas últimas 24 horas. O segundo, composto por 10 sintomas físicos e 5 psicológicos, está relacionado aos sintomas experimentados na última semana. E o terceiro quadro, composto por 12

sintomas físicos e 11 psicológicos, refere-se a sintomas experimentados no último mês. Alguns dos sintomas que aparecem no quadro 1 voltam a aparecer no quadro 3, diferenciando-se quanto à intensidade diferente e seriedade.

Para avaliar a qualidade de vida foi utilizado o questionário WHOQOL-BRIEF (World Health Organization Quality of Life Group – Grupo de Qualidade de Vida da Organização Mundial da Saúde) proposto por Fleck et al. (2000), que consiste de 26 questões, sendo duas questões gerais sobre a satisfação com a saúde e com a qualidade de vida e outras 24 correspondentes a quatro domínios (físico, psicológico, relações sociais e meio ambiente). O domínio físico refere-se a aspectos da saúde orgânica, levantando informações sobre dor e desconforto, energia e fadiga, mobilidade, necessidade de assistência médica. O domínio psicológico diz respeito a afetos positivos, memória, concentração, autoestima, imagem corporal e aparência. O domínio social investiga as relações interpessoais e redes de apoio social. O domínio ambiental trata de questões relativas à segurança física e proteção, recursos financeiros, transporte, moradia, entre outros.

Os resultados dos escores brutos de cada faceta foram transformados em um escore que variou de zero a 100. Esta transformação de um escore bruto para um escore transformado da escala entre o zero e 100 possibilitou expressar o escore da escala em percentagem entre o valor mais baixo possível (0) e o mais alto possível (100) de classificação da qualidade de vida de acordo com o manual do WHOQOL-BRIEF (FLECK et al., 2000). Através da amplitude das respostas, os valores de 0 – 20 foram classificados como muito insatisfeitos, 21 – 40 insatisfeitos, 41 – 60 nem insatisfeitos nem satisfeitos, 61 – 80 satisfeitos e 81 – 100 muito satisfeitos. Além disso, na escala utilizada de zero a 100, quanto mais próximo o escore médio dos professores estiver de 100, mais satisfeita ou positiva é a percepção da qualidade de vida geral (QV geral).

Todos os dados foram colocados em um planilha de Excel e posteriormente exportados para o programa estatístico Graph Pad Prisma, versão 9.0, para realizar as análises estatísticas. Foi realizada a análise descritiva dos dados e os resultados foram apresentados com frequência absoluta e relativa (%), mediana e intervalo de confiança (IC95%). Para comparar os sintomas físicos e psicológicos do estresse e os domínios da qualidade de vida, primeiramente foi realizado o teste de normalidade de Kolmogorov-Smirnov para determinar a estatística paramétrica ou não paramétrica. Devido à falta de normalidade das variáveis, foi realizado o teste de Mann-Whitney para amostras não-pareadas e o teste de Kruskal-Wallis para a comparação entre os domínios, e

quando encontrasse diferença significativa o teste de post hoc de Dunn.

Para a análise dos resultados da qualidade de vida foi utilizado o modelo estatístico adotado pelo WHOQOL-BREF, segundo o método e resultados de grupos focais no Brasil (FERRAZ et al., 2002). O nível de significância adotado para todas os testes foi de  $p < 0,05$ .

### III. RESULTADOS

As características sociodemográficas das professoras mostraram que a maioria tinha idade acima de 41 anos, viviam com companheiro, possuíam até 2

filhos e com especialização na área. Além disso, 55,7% das professoras praticavam algum tipo de atividade física semanal, 94,9% não eram tabagistas e 69,9% não utiliza medicamento diário (TABELA 1).

Com relação as características ocupacionais das professoras, predominou as que trabalham como não estatutárias, com experiência de até 10 anos como docente, carga horária de trabalho semanal de 21 a 40 horas distribuídos em 2 turnos e atendem em média 21 a 40 alunos em sala de aula. Se afastaram das atividades de docência por motivo de saúde 42,0% das professoras (Tabela 1).

*Tabela 1:* Perfil sociodemográfico e ocupacional das professoras.

Variáveis	N (176)	%
Idade		
20-30 anos	35	20,0
31-40 anos	59	33,0
41 anos ou mais	83	47,2
Estado conjugal		
Com companheiro	132	75,0
Sem companheiro	44	25,0
Número de filhos		
0 a 2 filhos	162	92,0
3 filhos ou mais	14	8,0
Escolaridade		
Graduação	39	22,2
Especialização	134	76,1
Mestrado	02	1,1
Doutorado	1	0,6
Pratica atividade física semanal?		
Sim	98	55,7
Não	78	44,3
Tabagista		
Sim	9	5,1
Não	167	94,9
Utiliza medicamento diário?		
Sim	53	30,1
Não	123	69,9
Tipo de contrato		
Estatutário	86	48,9
Não estatutário	90	51,2
Tempo de docencia		
1 a 10 anos	78	44,3
11 a 20 anos	63	35,8
21 anos ou mais	35	19,9
Carga horária semanal		
Até 20 horas	27	15,3



21 a 40 horas	127	72,2
41 horas ou mais	22	12,5
Turno de trabalho		
1 turno	18	10,2
2 turnos	97	55,1
3 turnos	61	34,7
Número de alunos por turma		
Até 20 alunos	23	13,1
21 a 40 alunos	153	86,9
Se afastou do trabalho por problemas de saúde?		
Sim	74	42,0
Não	102	58,0

Fonte: Elaboração dos autores.

Algum nível de estresse foi observado em 26,8% estavam na fase de quase exaustão. Os 48,9% das professoras (Tabela 2). Em termos de intensidade da manifestação do problema, 73,2% das professoras encontrava-se na fase de resistência e 26,8% estavam na fase de quase exaustão. Os sintomas psicológicos predominaram sobre os sintomas físicos nas professoras ( $p < 0,0001$ ).

**Tabela 2:** Frequência, fase e sintomas de estresse das professoras.

	N	%
Estresse		
Sim	86	48,9
Não	90	51,1
Fase		
Alerta	-	-
Resistência	63	73,2
Quase exaustão	23	26,8
Exaustão	-	-
Sintomas		
Físico	-	40,0
Psicológico	-	60,0*

Fonte: Elaboração dos autores. Nota: \* $p < 0,0001$  comparado ao sintoma físico.

A percepção em cada domínio da qualidade de vida mostrou que o domínio físico e do meio ambiente tiveram os piores escores e maior insatisfação, enquanto que os domínios relações sociais e psicológico obtiveram os melhores escores e satisfação nas professoras (TABELA 3).

Quando comparados os domínios (TABELA 3), o escore do domínio físico foi significativamente menor do que o domínio relações sociais e psicológico

( $p < 0,0001$ ). Também, o domínio meio ambiente teve um escore significativamente menor do que o domínio relações sociais e psicológico ( $p < 0,01$ ).

Não houve diferença entre os domínios com pior escore (físico vs meio ambiente) e melhor escore (relações sociais vs psicológico) ( $p > 0,05$ ). O escore geral da percepção da qualidade de vida de 59,3 demonstrou que estavam insatisfeitas (TABELA 3).

**Tabela 3:** Percepção da qualidade de vida em cada domínio do WHOQOL-BREF e a qualidade de vida geral (QV) das professoras.

Domínios	Mediana	IC95%
Físico	55,5	53,8 – 57,1
Psicológico	62,5 <sup>*a</sup>	60,2 – 63,5
Relações sociais	66,7 <sup>*a</sup>	63,8 – 68,3
Meio ambiente	56,3	54,9 – 59,4
QV Geral	59,3	58,3 – 61,4

Fonte: Elaboração dos autores. Nota: \* $p < 0,0001$  comparado ao domínio físico; <sup>a</sup> $p < 0,01$  comparado ao domínio meio ambiente.

#### IV. DISCUSSÃO

A finalidade desta pesquisa foi realizar uma avaliação dos níveis e sintomas de estresse, além de analisar a percepção da qualidade de vida de professoras que atuam no ensino infantil, fundamental e médio da rede municipal de ensino. Os achados mostraram que as professoras estavam na fase de resistência e quase exaustão do estresse e os sintomas psicológicos predominaram sobre os sintomas físicos. Ademais, a insatisfação com a qualidade de vida predominou nas professoras.

As características sociais e demográficas das professoras (TABELA 1), possuem semelhanças com estudos nacionais e internacionais, mostrando que a maioria são de jovens adultos, com companheiro e filhos, além de possuir especialização na área (ABBASI; GHAHREMANI; NAZARI; FARAROU EI et al., 2021; BARBOSA; JESUS; COSTA; SANTOS et al., 2022; MARTINS; SALVADOR; LUZ, 2020; ROCHA; PRADO FILHO; SILVA; BOSCARI et al., 2017; VIEGAS, 2022).

Com relação ao estilo e os hábitos de vida das professoras, a maior parte realizava atividade física semanal, não fumava e não utilizava medicamentos diários (TABELA 1). Estes resultados corroboram com outros estudos publicados recentemente com professores da Educação Básica em diferentes regiões brasileiras, e de outros países. Por exemplo, em uma pesquisa com 745 professores da educação básica da rede de ensino municipal da cidade de Montes Claros, Minas Gerais, observou-se que grande parte eram ativos fisicamente e não fumavam (HAIKAL; PRATES; VIEIRA; MAGALHÃES et al., 2023). Outra pesquisa com 141 professores de escolas públicas de um município da região Sul do Brasil, observou que mais da metade reportaram que praticavam atividade física semanal (SANTOS; GABANI; DE ANDRADE; GUIDONI et al., 2022). Em outro estudo com 254 professores do ensino primário e secundário da Polônia, 80% da amostra alcançavam as recomendações da Organização Mundial da Saúde para atividade física de moderada intensidade (GRABARA, 2023). Outra pesquisa com 15.641 professores que atuavam nas escolas estaduais e municipais do estado de Minas Gerais, também os professores em sua grande maioria eram ativos fisicamente e utilizam pouco medicamentos (SILVA; ROSE ELIZABETH CABRAL; LEÃO; PENA et al., 2021).

Destacamos que hábitos saudáveis como ser fisicamente ativo, não fumar e o uso de pouco medicamento, diminuem as chances de desenvolver uma série de doenças crônicas, tais como câncer, doenças pulmonares e cardiovasculares, e o diabetes mellitus.

A experiência acima de 11 anos como docente, com carga horária semanal de até 40 horas, 2 turnos de trabalho e turmas entre 21 a 40 alunos (TABELA 1), é uma realidade encontrada no trabalho dos professores

da Educação Básica brasileira (BARBOSA; JESUS; COSTA; SANTOS et al., 2022; SILVA; ROSE ELIZABETH CABRAL; LEÃO; PENA et al., 2021; VIEGAS, 2022). É importante salientar que somado as condições precárias de trabalho, a indisciplina em sala de aula dos estudantes, a burocracia administrativa, déficit de recursos, situação salarial e aos afazeres domésticos, as professoras estão mais expostas a sobrecarga de trabalho que têm contribuído para aumentar os níveis de estresse, diminuir a qualidade de vida e elevar as taxas de afastamento do trabalho (LUZ; PESSA; LUZ; SCHENATTO, 2019).

Nesta pesquisa, 42,0% das professoras se afastaram das suas atividades laborais por algum agravo à saúde (TABELA 1). Consideramos que a alta frequência de afastamentos encontrada neste estudo, pode estar relacionada aos estresse e a insatisfação com a qualidade de vida das professoras encontradas (TABELA 2 e 3).

Elevados níveis de estresse por longos períodos de tempo (estresse crônico) podem levar ao comprometimento das funções fisiológicas normais e piorar problemas de saúde pré-existent, ou resultar em condições patológicas como os transtornos mentais, os distúrbios do sistema musculoesquelético, os problemas vocais e as morbidades em geral (AGYAPONG; CHISHIMBA; WEI; DA LUZ DIAS et al., 2023; ASSUNÇÃO; ABREU, 2019). Esses problemas afetam as condições emocionais, físicas e sociais das professoras, resultando na diminuição do bem-estar geral e da qualidade de vida relacionada ao trabalho (NETO; BURKE; CHRISTOFOLLETTI; DE ALENCAR, 2023).

O problema da ausência do professor é o impacto negativo no rendimento dos estudantes, reduzindo as potencialidades de aprendizagem e aumentando os gastos públicos para o tratamento de saúde e para as substituições destes professores (SCHEUCH et al., 2015). Observa-se que quando o professor se afasta das suas atividades laborais, também altera a rotina escolar, reduz o tempo produtivo da aula para a adaptação aos procedimentos e estabelecimento da disciplina na classe (TAVARES; HONDA, 2021).

Com relação a presença do estresse, 48,9% das professoras estão experimentando (TABELA 2). Em um estudo de revisão de escopo que analisou a prevalência de estresse em professores no período entre 1974 a 2022, mostrou que a mediana foi de aproximadamente 32,5% nos docentes, contudo, houve uma variação de 6,0% à 100% nos estudos (AGYAPONG; OBUOBI-DONKOR; BURBACK; WEI, 2022). Em uma meta-análise com 54 estudos, realizada entre 2019 à 2021, a prevalência de stress nos professores foi de 62,6%, variando de 46,1% até 76,6% nas pesquisas (MA; LIANG; CHUTYAMI; NICOLL et al., 2022).

Apesar da heterogeneidade na prevalência de estresse nas pesquisas citadas acima, destaca-se que na maioria dos estudos incluídos nas revisões que compararam os níveis de estresse entre os gêneros, as professoras apresentaram níveis mais elevados do que os seus colegas professores. Isto pode ser explicado por dois motivos principais, a jornada de trabalho e a incapacidade física e intelectual para suprir as demandas.

O tempo para a realização de todas as suas atividades é insuficiente, sendo necessário estender o tempo de trabalho à esfera doméstica, onde as tarefas são desenvolvidas em meio a outras atividades ligadas ao cuidado da casa, dos filhos e frequentemente de outros familiares, assim intensificando também o trabalho doméstico. A quantidade de tarefas que as professoras precisam dar conta vão além das capacidades físicas e intelectuais de sua força de trabalho, exigindo-lhes esforços que frequentemente resultam em adoecimento físico e psíquico (VIEGAS, 2022).

Acerca das fases que as professoras se encontravam no estresse, a maioria estavam na fase de resistência e 26,8% já se encontravam na fase de quase exaustão (TABELA 2). É importante destacar que na fase de resistência as professoras estão tentando enfrentar os fatores estressores em busca de equilíbrio psicológico e físico nas situações e ambientes de trabalho. Na fase de quase exaustão, as professoras começam a ceder à pressão de estressores persistentes, passando a perder as condições de lidar com estes de maneira saudável, tendendo a uma manifestação patológica dos sintomas, o que pode baixar a produtividade e contribuir para o baixo desempenho no processo de ensino e aprendizagem dos estudantes (ROCHA; PRADO FILHO; SILVA; BOSCARI et al., 2017).

O predomínio dos sintomas psicológicos sobre os físicos nas professoras (TABELA 2), não é diferente de estudos anteriores que apontaram que os elevados níveis de estresse nos docentes da Educação Básica estavam relacionados aos fatores psicológicos (GOULART JUNIOR; LIPP, 2008; NEVES; SILVA, 2006; PEREIRA; TEIXEIRA; LOPES, 2013; ROCHA; PRADO FILHO; SILVA; BOSCARI et al., 2017; SILVEIRA; ENUMO; BATISTA, 2014; TANGANELLI; LIPP, 1998).

Salienta-se que o estresse é um problema de saúde mental e quando os professores estão acometidos, afetam negativamente os estudantes, pois professores estressados podem ter respostas e comportamentos negativos imprevistos, extremos ou drásticos e se tornarem intolerantes aos alunos, afetando assim a qualidade da educação fornecida aos alunos (CHESAK; KHALSA; BHAGRA; JENKINS et al., 2019).

Os resultados nos domínios da qualidade de vida com o WHOQOL-bref mostraram que o domínio

físico e do meio ambiente tiveram os piores escores enquanto que o domínio relações sociais e psicológico os melhores (TABELA 3). Estes achados corroboram com outras investigações realizadas com o WHOQOL-bref com professores da Educação Básica (ROCHA; PRADO FILHO; SILVA; BOSCARI et al., 2017; VEGA-FERNÁNDEZ; LERA; LEYTON; CORTÉS et al., 2021; VEGA-FERNÁNDEZ; OLAVE; LIZANA, 2022).

A insatisfação no domínio físico e meio ambiente das professoras está relacionada com a sua incapacidade de trabalho, fadiga, dependência de medicamentos, dor, mobilidade para a realização das atividades da vida diária, bem como segurança, cuidados de saúde, clima, transportes, oportunidades de adquirir novos conhecimentos, lazer e recursos financeiros. A satisfação no domínio relações sociais e psicológico refere-se com às relações pessoais, apoio social, atividade sexual, autoestima, aparência e imagem corporal, aspectos cognitivos como aprendizagem e memória, e sentimentos (ROCHA; PRADO FILHO; SILVA; BOSCARI et al., 2017).

O escore geral de 59,3% demonstrou que as professoras estão insatisfeitas com a sua qualidade de vida (TABELA 3). Inferimos que os níveis de estresse encontrado nesta pesquisa podem explicar este resultado. O estresse excessivo e prolongado pode impedir o funcionamento diário e o equilíbrio emocional, provocando nas professoras um aumento da ansiedade, da fadiga mental e burnout, reduzindo a satisfação no trabalho e o bem-estar geral. (AGYAPONG; OBUOBI-DONKOR; BURBACK; WEI, 2022).

Apesar da relevância deste estudo para a área educacional, é importante apontar que a época de realização da coleta de dados (outubro a início de dezembro), é um momento de sobrecarga resultante de acúmulos anteriores, fatores que podem interferir no estresse e na percepção da qualidade de vida, limitando os resultados.

## V. CONSIDERAÇÕES FINAIS

Em resumo, os dados mostram que a frequência de estresse nas professoras da Educação Básica é alta e a maioria se encontram na fase de resistência com um número preocupante na fase de quase exaustão. Com relação aos sintomas do estresse, os fatores psicológicos predominaram sobre os sintomas físicos e a qualidade de vida geral está aquém do desejado, observado pela insatisfação das professoras no aspecto físico e do meio ambiente.

Diante dos achados desta pesquisa sugerimos que sejam implantadas políticas educacionais de saúde e qualidade de vida no trabalho para as professoras da Educação Básica com a finalidade de prevenir e atenuar os agravos à saúde relacionados ao estresse. Propomos ainda que profissionais de saúde sejam

inseridos nos programas de formação continuada para professores com temas relacionados ao controle e manejo do estresse, palestras de conscientização e motivação para o autocuidado da saúde física, mental e emocional.

É pertinente que outros estudos sejam realizados investigando longitudinalmente possíveis fatores estressantes que poderiam influenciar na saúde e na qualidade de vida das professoras da Educação Básica.

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### REFERENCES RÉFÉRENCES REFERENCIAS

1. ABBASI, F.; GHAREMANI, L.; NAZARI, M.; FARAROUEI, M.; KHORAMAKI, Z. Lifestyle in Female Teachers: Educational Intervention Based on Self-Efficacy Theory in the South of Fars Province, Iran. *BioMed Research International*, p. 6177034, 2021. Doi: 10.1155/2021/6177034. Disponível em: <https://downloads.hindawi.com/journals/bmri/2021/6177034.pdf>. Acesso em: 02 fev. 2024.
2. AGYAPONG, B.; CHISHIMBA, C.; WEI, Y.; DIAS, R. da L.; EBOREIME, E.; MSIDI, E.; ABIDI, S. S. R.; MUTAKA-LOONGO, M.; ORJI, R.; ZULU, J. M.; AGYAPONG, V. I. O. Improving Mental Health Literacy and Reducing Psychological Problems Among Teachers in Zambia: Protocol for Implementation and Evaluation of a Wellness 4Teachers Email Messaging Program. *JMIR Research Protocols*, v. 12, p. e44370, 2023. DOI: 10.2196/44370. Disponível em: <file:///C:/Users/db rid/Downloads/PDF.pdf>. Acesso em: 01 mar. 2024.
3. AGYAPONG, B.; OBUOBI-DONKOR, G.; BURBACK, L.; WEI, Y. Stress, Burnout, Anxiety and Depression among Teachers: A Scoping Review. *International Journal of Environmental Research and Public Health*, 19, n. 17, p. 10706, 2022. DOI: 10.3390/ijerph191710706. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/36078422/>. Acesso em: 20mjan.
4. ARAÚJO, T. M. de.; PINHO, P. de S.; MASSON, M. L. V. Trabalho e saúde de professoras e professores do Brasil: reflexões sobre trajetórias das investigações, avanços e desafios. *Cadernos de Saúde Pública*, Rio de Janeiro, v. 35, p. e00087318, 2019. DOI: 10.1590/0102-311X00087318. Disponível em: <https://www.scielo.br/j/csp/a/BYh8RV9xyw6N6kdJSqqHkLg/#>. Acesso em: 10 fev. 2024.
5. ASSUNÇÃO, A. Á.; ABREU, M. N. S. Pressure to work, health status, and work conditions of schoolteachers in Basic Education in Brazil. *Cadernos de Saúde Pública*, v. 35, p. e00169517, 2019. DOI: 10.1590/0102-311X00169517. Disponível em: <https://www.scielo.br/j/csp/a/55zZgFsrpQymdbfmxxZDYzw/?lang=pt#>. Acesso em: 10 fev. 2024.
6. BARBOSA, R. E. C.; JESUS, A. S. G. de.; COSTA, D. N. F.; SANTOS, E. O.; SOARES, N. C.; JESUS, Y. N. O. N. de.; FONSECA, G. C.; ASSUNÇÃO, A. Á.; HAIKAL, D. S. Condições de vida e saúde de professoras da educação básica pública de Minas Gerais provedoras financeiras de suas famílias durante a pandemia de Covid-19. *Revista Brasileira de Estudos de População*, Rio de Janeiro, v. 39, p. e0226, 2022. DOI: 10.20947/S0102-3098a0226. Disponível em: <https://www.scielo.br/j/rbepop/a/nTWh5yJrBgHXWDQk5vvyd5B/abstract/?lang=pt#>. Acesso em: 08 fev. 2024.
7. CARLOTTO, M. S.; CÂMARA, S. G.; DIEHL, L.; ELY, K.; FREITAS, I. M. de.; SCHNEIDER, G. de A. Estressores ocupacionais e estratégias de enfrentamento. *Revista Subjetividades*, Fortaleza, v. 18, n. 1, p. 92-105, 2018. DOI: 10.5020/23590777. Disponível em: [http://pepsic.bvsalud.org/scielo.php?script=sci\\_arttext&pid=S2359-07692018000100009&lng=pt&nrm=iso](http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S2359-07692018000100009&lng=pt&nrm=iso). Acesso em: 30 jan. 2024.
8. CHESAK, S. S.; KHALSA, T.K.; BHAGRA, A.; JENKINS, S. M.; BAUER, B. A.; SOOD, A. Stress Management and Resiliency Training for public school teachers and staff: A novel intervention to enhance resilience and positively impact student interactions. *Complementary Therapies in Clinical Practice*, v. 37, p. 32-38, 2019. DOI: 10.1016/j.ctcp.2019.08.001. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/31445365/>. Acesso em: 15 fev. 2024.
9. FERRACCIU, C. C. S. *Distúrbio de voz relacionado ao trabalho e estratégias de enfrentamento em professoras da rede pública estadual de Alagoas*. 2013. Tese (Doutorado em Ciências na área de Saúde Pública), Escola Nacional de Saúde Pública Sergio Arouca, Rio de Janeiro, p. 153, 2013.
10. FERRAZ, E. V. A. P.; LIMA, C. A.; CELLA, W.; ARIETA, C. E. L. Adaptação de questionário de avaliação da qualidade de vida para aplicação em portadores de catarata. *Arquivos Brasileiros de Oftalmologia*, v. 65, n.3, p. 293-298, 2002. Doi: 10.1590/S0004-27492002000300002. Disponível em: <https://www.scielo.br/j/abo/a/Wp57qZVMjNVrjbGsrcTvTyx/abstract/?lang=pt>. Acesso em: 26 fev.
11. FLECK, M. P. A.; LOUZADA, S.; XAVIER, M.; CHACHAMOVICH, E.; VIEIRA, G.; SANTOS, L. Aplicação da versão em português do instrumento abreviado de avaliação da qualidade de vida "WHOQOL-bref". *Revista de Saúde Pública*, v. 34, n. 2, p. 178-183, 2000. Doi: 10.1590/S0034-8910200000200012. Disponível em: <https://www.scielo.br/>



- j/rsp/a/JVdm5QNjj4xHsRzMFbF7trN/?lang=pt. Acesso em: 15 fev.
12. GOULART JUNIOR, E.; LIPP, M. E. N.; Estresse entre professoras do ensino fundamental de escolas públicas estaduais. *Psicologia em Estudo*, Maringá, v. 13, n.4, p. 847-857, 2008. Disponível em: <https://www.scielo.br/j/pe/a/QBScTyq8L8bqRnbMydKYNDJ/#>. Acesso em: 14 fev. 2024.
  13. GRABARA, M. The association between physical activity and musculoskeletal disorders-a cross-sectional study of teachers. *PeerJ*, v. 11, p. e14872, 2023. DOI: 10.7717/peerj.14872. Disponível em: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9961098/>. Acesso em: 05 mar. 2024.
  14. GUIDETTI, G.; VIOTTI, S.; BADAGLIACCA, R.; COLOMBO, L.; CONVERSO, D. Can mindfulness mitigate the energy-depleting process and increase job resources to prevent burnout? A study on the mindfulness trait in the school context. *PLoS One*, 14, n. 4, p. e0214935, 2019. DOI: 10.1371/journal.pone.0214935. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/30947256/>. Acesso em: 02 fev. 2024.
  15. HAIKAL, D. S.; PRATES, T. E. C.; VIEIRA, M. R. M.; MAGALHÃES, T. A. de.; BALDO, M. P.; PAULA, A. M. B. de.; FERREIRA, E. F. E. Fatores de risco e proteção para doenças crônicas não transmissíveis entre professores da educação básica. *Revista Brasileira de Saúde Ocupacional*, São Paulo, v. 48, p. e5, 2023. DOI: 10.1590/2317-6369/42520pt2023v48e5. Disponível em: <https://qa1.scielo.br/j/rbso/a/MYnZtnySrcNpnYRFbdkxFc/?lang=pt>. Acesso em: 25 fev. 2024.
  16. LIPP, M. E. N. *Manual de aplicação do inventário de sintomas de stress para adultos de Lipp*. São Paulo: Casa do Psicólogo; 2000.
  17. LU, S.; WEI, F.; LI, G. The Evolution of the concept of stress and the framework of the stress system. *Cell stress*, v. 5, n.6, p. 76-85, 2021. DOI: 10.15698/cst2021.06.250. Disponível em: <http://europepmc.org/abstract/MED/34124582>. Acesso em: 10 fev. 2024.
  18. LUZ, J. G. da.; PESSA, S. L. R.; LUZ, R. P. da.; SCHENATTO, F. J. A. Implications of the environment, conditions and organization of work on teacher health: a systematic review. *Ciência & Saúde Coletiva*, v. 24, n. 12, p. 4621-4632, 2019. DOI: 10.1590/1413-812320182412.26352017. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/31778512/>. Acesso em: 02 mar. 2024.
  19. MA, K.; LIANG, L.; CHUTYIAMI, M.; NICOLL, S.; KHAERUDIN, T.; HA, X. V. COVID-19 pandemic-related anxiety, stress, and depression among teachers: A systematic review and meta-analysis. *Work*, v. 73, n. 1, p. 3-27, 2022. DOI: 10.3233/WOR-220062. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/35527618/>. Acesso em: 28 jan. 2024.
  20. MARTINS, N. H. S. P.; SALVADOR, D. F.; LUZ, M. R. M. P. O mal-estar docente nas discussões sobre ensino nutrição: falas de professoras da educação básica em fóruns virtuais. *Trabalho, Educação e Saúde*, Rio de Janeiro, v. 18, n. 3, p. e00286118, 2020. DOI: doi.org/10.1590/1981-7746-sol00286. Disponível em: <https://www.scielo.br/j/tes/a/ngFCqghg5dXFv5LKGDtmnsc/#>. Acesso em: 18 fev. 2024.
  21. MUSA, N. A.; MOY, F. M.; WONG, L. P. Prevalence and factors associated with poor sleep quality among secondary school teachers in a developing country. *Industrial Health*, v. 56, n. 5, p. 407-418, 2018. DOI: 10.2486/indhealth.2018-0052. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/29848899/>. Acesso em: 27 fev. 2024.
  22. NETO, L. B.; BURKE, T. N.; CHRISTOFOLLETTI, G.; DE ALENCAR, G. P. Burnout syndrome, work ability, quality of life and physical activity in teachers during the COVID-19 pandemic in Campo Grande, Brazil. *Work*, p. 1-9, 2023. DOI: 10.3233/wor-220187. Disponível em: <https://europepmc.org/article/MED/37483044>. Acesso em: 03 fev. 2024.
  23. NEVES, M. Y. R.; SILVA, E. S. A dor e a delícia de ser (estar) professora: trabalho docente e saúde mental. *Estudos e Pesquisas em Psicologia*, Rio de Janeiro, v. 6, n. 1, p. 63-75, 2006. Disponível em: [http://pep.sic.bvsalud.org/scielo.php?script=sci\\_arttext&pid=S1808-42812006000100006#:~:text=Identificamo s%20o%20custo%20ps%C3%ADquico%20para%20 essas%20profissionais%20do,darem%20conta%20 satisfatoriamente%20das%20atividades%20dom%C3%A9sticas%20e%20familiares](http://pep.sic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1808-42812006000100006#:~:text=Identificamo s%20o%20custo%20ps%C3%ADquico%20para%20 essas%20profissionais%20do,darem%20conta%20 satisfatoriamente%20das%20atividades%20dom%C3%A9sticas%20e%20familiares). Acesso em: 27 jan. 2024.
  24. PEREIRA, É. F.; RODRIGUES, P. C. *Bioestatística*. 3. ed. Niterói: Eduff; 2002.
  25. ROCHA, R. E. R. da.; PRADRO FILHO, K.; SILVA, F. N. da.; BOSCARI, M.; AMER, S. A. K.; ALMEIDA, D. C. de. Sintomas osteomusculares e estresse não alteram a qualidade de vida de professores da educação básica. *Fisioterapia e Pesquisa*, São Paulo, v. 24, n. 3, p. 259-266, 2017. DOI: 10.1590/1809-2950/16447524032017. Disponível em: <https://www.scielo.br/j/fp/a/bKqJKpyG3yXN6y7T7y6G7Vc/#>. Acesso em: 18 jan. 2024.
  26. SANTOS, M. C. da S.; GABANI, F. L.; DE ANDRADE, S. M.; GUIDONI, C. M.; GIROTTO, E.; CAMPANINI, M. Z.; MESAS, A. E. Free-time physical activity and pain perception: Na analysis of daily records from Brazilian teachers. *Physiology & Behavior*, v. 252, p. 113750, 2022. DOI: 10.1016/j.physbeh.2022.113750. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/35192802/>. Acesso em: 09 jan. 2024.
  27. SELYE, H. A Syndrome produced by Diverse Nocuous Agents. *Nature*, v. 138, n. 3479, p. 32-32, 1936. DOI: 10.1038/138032a0. Disponível em: <https://www.nature.com/articles/138032a0>. Acesso em: 19 fev. 2024.

25. SILVA, N. S. S. e.; CABRAL, B. R. E.; LEÃO, L. L.; PENA, G. dos G.; PINHO, L. de.; MAGALHÃES, T. A. de.; SILVEIRA, M. F.; ROSSI-BARBOSA, L. A. R.; SILVA, R. R. V.; HAIKAL, D. S. Working conditions, lifestyle and mental health of Brazilian public-school teachers during the COVID-19 pandemic. *Psiquiatriki*, v. 32, n. 4, p. 282-289, 2021. DOI: 10.22365/jpsych.2021.045. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/34860687/>. Acesso em: 30 jan. 2024.
26. SILVEIRA, K. A.; ENUMO, S. R. F.; BATISTA, E. P. Indicadores de estresse e estratégias de enfrentamento em professores de ensino multisseriado. *Psicologia Escolar e Educacional*, São Paulo, v. 18, n. 3, p. 457-465, 2014. DOI: 10.1590/2175-3539/2014/0183767. Disponível em: <https://www.scielo.br/j/pee/a/dnJczNw4VcsNFB577ppk6Wz/#>. Acesso em: 13 fev. 2024. METACKOVA, I.; VIKTOROVA, I. MARTANOVA, V. P.; PACHOVA, A.; FRANCOVA, V.; STECH, S. Teachers Between Job Satisfaction and Burnout Syndrome: What Makes Difference in Czech Elementary Schools. *Front Psychology*, v. 10, p. 2287, 2019. DOI: 10.3389/fpsyg.2019.02287. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/31736813/>. Acesso em: 22 jan. 2024.
27. STEPANOVA, G. K.; USTINOVA, M. V.; NIKOLAEVA, I. V. Life quality of employees of the north-eastern federal university (YAKUTSK). *Wiad Lek*, v. 74, n. 2, p. 225-227, 2021. Disponível em: <https://europepmc.org/article/MED/33813476>. Acesso em: 06 fev. 2024. TANGANELLI, M. do S. L.; LIPP, M. E. N. Sintomas de stress na rede pública de ensino. *Estudos de Psicologia (Campinas)*, São Paulo, v. 15, n. 3, p. 17-27, 1998. DOI: 10.1590/S0103-166X1998000300002. Disponível em: <https://www.scielo.br/j/estpsi/a/3S8qxWwgF5VsdHbXmLKNCZh/#>. Acesso em: 01 mar. 2024.
28. TEIXEIRA, C. S.; LOPES, A. da S. Qualidade de vida de professores de educação básica do município de Florianópolis, SC, Brasil. *Ciência & Saúde Coletiva*, Rio de Janeiro, v. 18, n. 7, p. 1963-1970, 2013. DOI: 10.1590/S1413-81232013000700011. Disponível em: <https://www.scielo.br/j/csc/a/w86L3g7FxgFWr3ZHbPschkP/#>. Acesso em: 23 jan. 2024. TUOMINEN, P. P. A.; MAYOR, P. Motivation, stress, recovery, and physical activity of teachers: discoveries with the Reiss Motivation Profile and the Firstbeat measurement. *Z Gesundh Wiss*, p. 1-11, 2023. DOI: 10.1007/s10389-023-01828-1. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/36718231/>. Acesso em: 22 jan. 2024.
29. VEJA-FERNÁNDEZ, G.; LERA, L.; LEYTON, B.; CORTÉS, P.; LIZANA, P. A. Musculoskeletal Disorders Associated With Quality of Life and Body Composition in Urban and Rural Public School Teachers. *Front Public Health*, v. 9, p. 607318, 2021. DOI: 10.3389/fpubh.2021.607318. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/34141698/#:~:text=A%20logistic%20regression%20model%20was%20used%20to%20evaluate,obesity%2C%20with%20the%20highest%20rate%20in%20rural%20women>. Acesso em: 18 fev. 2024.
30. VEJA-FERNÁNDEZ, G.; OLAVE, E.; LIZANE, P. A. Musculoskeletal Disorders and Quality of Life in Chilean Teachers: A Cross-Sectional Study. *Front Public Health*, v. 10, p. 810036, 2022. DOI: 10.3389/fpubh.2022.810036. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/35425737/>. Acesso em: 27 fev. 2024.
31. VIEGAS, M. F. Trabalhando todo o tempo: sobrecarga e intensificação no trabalho de professoras da educação básica. *Educação e Pesquisa*, v. 48, p. e244193, 2022. DOI: 10.1590/S1678-4634202248244193. Disponível em: <https://www.scielo.br/j/ep/a/7Jx7mQXpBGZp5CLgcW94WHy/#>. Acesso em: 19 jan. 2024.



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## Bolsonaro's Equation for Social Assistance Policy during his Degovernment: Less Resources, More Expressions of the Social Issue in Brazil

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**Abstract-** The National Social Assistance Policy in Brazil during the Bolsonaro (dis)government period is vehemently affected by its ultraneoliberal dynamics of underfunding and moralization. Therefore, the present work seeks to present some aspects about the defunding, implementation and effectiveness of this policy in this period. Our methodology encompasses bibliographical and documentary research of the exploratory type, using historical-dialectical materialism as a method. Therefore, we conclude that Bolsonaro fulfilled the objective he proposed when he became president of the republic of dismantling any type of social protection for the most vulnerable, like the National Social Assistance Policy itself, aggravating social inequalities.

**Keywords:** *definancing; social assistance policy; ultraneoliberalism; bolsonaro's (mis)government; social issues.*

**GJHSS-H Classification:** *FOR Code: 160601*



BOLSONAROSEQUATIONFORSOCIALASSISTANCEPOLICYDURINGHISDEGOVERNMENTLESSRESOURCESMOREEXPRESSIONSOFTHESOCIALISSUEINBRAZIL

*Strictly as per the compliance and regulations of:*



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# Bolsonaro's Equation for Social Assistance Policy during his Degovernment: Less Resources, More Expressions of the Social Issue in Brazil

A Equação de Bolsonaro Para a Política de Assistência Social Durante Seu Desgoverno: Menos Recursos, Mais Expressões da Questão Social no Brasil

Jodeylson Islony De Lima Sobrinho <sup>α</sup> & Gabriel da Veiga <sup>σ</sup>

**Resumo-** A Política Nacional de Assistência Social no Brasil no período do (des)governo Bolsonaro é atingida veemente com sua dinâmica ultraneoliberal de desfinanciamento e moralização. Assim sendo, o presente trabalho busca apresentar alguns aspectos acerca do desfinanciamento, implementação e efetivação dessa política nesse período. Nossa metodologia abarca a pesquisa bibliográfica e documental do tipo exploratória, tendo como método o materialismo histórico-dialético. Assim sendo, concluímos que Bolsonaro cumpriu com o objetivo que propôs ao se lançar presidente da república de dismantlar qualquer tipo de proteção social aos mais vulneráveis, a exemplo da própria Política Nacional de Assistência Social, agravando as desigualdades sociais.

**Palavras-Chave:** desfinanciamento. política de assistência social. ultraneoliberalismo. (des) governo bolsonaro. questão social.

**Abstract-** The National Social Assistance Policy in Brazil during the Bolsonaro (dis)government period is vehemently affected by its ultraneoliberal dynamics of underfunding and moralization. Therefore, the present work seeks to present some aspects about the defunding, implementation and effectiveness of this policy in this period. Our methodology encompasses bibliographical and documentary research of the exploratory type, using historical-dialectical materialism as a method. Therefore, we conclude that Bolsonaro fulfilled the objective he proposed when he became president of the republic of dismantling any type of social protection for the most vulnerable, like the National Social Assistance Policy itself, aggravating social inequalities.

**Keywords:** definancing; social assistance policy; ultraneoliberalism; bolsonaro's (mis)government; social issues.

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## I. INTRODUÇÃO

Vivemos o aprofundamento da nova razão do mundo: o neoliberalismo econômico, que no Brasil é agravado recentemente por uma versão fundamentalista cristã (LÖWY, 2016), o qual vem devastando a economia, destruindo o trabalho com as mais diversas formas de desregulamentação, flexibilização, intensificação e precarização, de modo que os sofrimentos, adoecimentos e assédios tem sido mais a regra do que a exceção, agravados pela pandemia da COVID-19, e que expande o trabalho como informal, como bico, e também atinge o/a trabalhador/a assalariado/a na sua inteireza, em suas dimensões materiais e subjetivas, além de impactar na formação de associações e organizações das identidades coletivas.

A pandemia do novo corona vírus se dissemina em meio a uma grave crise pré-existente, de um conjunto de expropriações comandada pela busca de lucros a qualquer preço, ou seja, a pandemia não criou essa crise, mas certamente exacerbou seus traços mais perversos, tornando mais tangíveis, mais visíveis alguns processos que já estavam em curso, a exemplo de que já vivíamos no Brasil, desde os anos 1980, que mesmo diante das contradições advindas na década seguinte, se tinha alguns avanços no âmbito do direitos sociais, e por outro lado um processo permanente de erosão do trabalho contratado, regulado e protegido, que foi dominante durante todo o século XX, mesmo no Brasil que não construiu um Estado de bem-estar social, onde se instalou o chamado "Fordismo periférico" (BRAGA, 2012), um fordismo à brasileira, que nunca universalizou o trabalho assalariado e os direitos decorrentes.

O Brasil hoje ainda vive imerso às inflexões de uma tríplice crise, que diante das expressões advindas ainda pela crise econômica de 2007/2008, se acrescenta à crise sanitária provocada pela pandemia do COVID-19, em meio aos prolongados conflitos políticos, que vem desde o golpe dado à presidenta Dilma Rousseff (2014-2016, Partido do trabalhadores-PT), travejado de impeachment, e encorpada pelo governo deletério de Jair Messias Bolsonaro (2019-



2022, eleito Partido Social Liberal-PSL, mas hoje filiado ao Partido Liberal - PL).

Contudo, numa conjuntura que conforma a junção de uma tríplice crise: do capital, política e sanitária, e, diante de um governo federal deletério que teve como guisa uma forma retrograda e pretérita de compreensão da realidade social brasileira, o resultado não poderia ser outro: desmonte de políticas sociais públicas, precarização do trabalho, “captura” da subjetividade do/a trabalhador/a, onde se acelera todas as formas de minimização da vida da classe trabalhadora.

E mesmo que Bolsonaro derrotado nas urnas em 2022 pelo agora presidente Luiz Inácio Lula da Silva do Partido dos Trabalhadores (PT), que chega ao Palácio do Planalto através de uma frente ampla em defesa da democracia, o estrago ultraneoliberal operado por aquele está dado na realidade de milhares de brasileiros, tendo em vista a negação e até mesmo o enfrentamento direto ao conjunto de direitos e políticas públicas sociais que poderiam trazer um pouco de dignidade à vida das populações mais pauperizadas, a exemplo do desfinanciamento dessas políticas, dentre elas, a própria Política de Assistência Social, que será o nosso objeto de discussão aqui.

Assim sendo, esse artigo é fruto da pesquisa realizada no âmbito da graduação em Serviço Social na Universidade Estadual do Oeste do Paraná, *campus* de Francisco Beltrão (UNIOESTE/FBO), na qual analisamos a dinâmica ultraneoliberal no desfinanciamento da Política de Assistência Social no Brasil, a partir dos desmontes e contrarreformas operacionalizadas pelo (des)governo de Jair Bolsonaro, portanto, buscamos aqui apontar alguns elementos do que foi operado por aquele governo, durante seu mandato de presidente.

Desse modo, a construção analítica do objeto da pesquisa aqui expresso requereu a utilização de um conjunto de instrumentais técnico-operativos e teórico-metodológicos capazes de apreender as mediações que se autoimplicam e autodeterminam no ataque à política de Assistência Social, no que tange ao seu desfinanciamento, diante do avanço do ultraneoliberalismo moralista em tempos de crise tríplice na realidade brasileira. Dessa maneira, partindo das premissas marxianas e marxistas, em nossos processos de pesquisa a busca pela essência/lógica própria do objeto se deu por meio de aproximações sucessivas, de forma a não condicionar o processo à aparência emanada no movimento da realidade, o que nos levou a analisar o objeto em questão a partir de sua realidade concreta, elevando-a ao campo do abstrato, buscando, portanto, o concreto pensado, da qual trazemos algumas reflexões nesse artigo.

## II. O AVANÇO DO NEOLIBERALISMO E A RETRAÇÃO DAS POLÍTICAS SOCIAIS PÚBLICAS NO BRASIL DURANTE OS GOVERNOS DE TEMER-BOLSONARO

A crise do sistema capitalista mundial que se inicia em final dos anos 1970, na ânsia de encontrar explicações de outra ordem para os problemas gerados pelo próprio capitalismo, se espraia pelo mundo e coloca em questionamento uma série de ideias, valores e pressupostos da modernidade. Como resposta a tal crise, a burguesia inicia o processo de reestruturação produtiva<sup>1</sup>, refuncionando o capitalismo mundial, por meio do toyotismo e uma precarização crescente no mundo do trabalho, fundada em exigências cada vez mais robustas de produtividade e rapidez. Ao mesmo tempo, em que se “enxuga” a máquina estatal com cortes no âmbito social e em particular das políticas sociais, ou seja, são as expressões do chamado neoliberalismo.

Para as políticas sociais, o ideário neoliberal apresenta o trinômio privatização, focalização e descentralização, abrindo novos espaços de valorização para o capital, transferindo para ele fundo público e reduzindo a política social apenas para trabalhadores dos segmentos mais pauperizados. Avança no Brasil, então, a redução de recursos para o setor público com políticas de favorecimento para planos de saúde e para a educação privada, ressignificação da caridade por meio de programas como o Comunidade Solidária e a primeira rodada do que será a contrarreforma permanente da Previdência Social (CISLAGHI, 2020, p. 7).

Há nesse processo um conjunto de políticas que vão precarizar o trabalho, na perspectiva de aumentar as taxas da exploração ele, a exemplo das mudanças nas leis trabalhistas que permitem o aprofundamento da precarização, a luta pelo desmonte do movimento sindical, aprofundando o individualismo, com salários diferentes para as mesmas jornadas de trabalho, mesmo diante das resistências da classe trabalhadora.

E, por outro lado, se tem a apropriação do fundo público<sup>2</sup> por parte do capital, pois não há redução do Estado para o capital, o que há é a mudança de sua direção na formação do fundo público e no gasto desse fundo. As contrarreformas tributárias mantêm na realidade brasileira a tributação regressiva, a qual recai mais sobre os/as trabalhadores/as do que

<sup>1</sup> A reestruturação produtiva caracteriza-se, entre outros elementos, pela acumulação flexível, a qual se estrutura conformando uma nova organização de trabalho (Toyotismo), que intensifica as condições de exploração da força de trabalho, mas sob a aparência de colaboração e trabalho em equipe. Tal forma de trabalho também sustenta as bases de sedimentação do neoliberalismo. Ver, entre outros, Antunes (1999).

<sup>2</sup> Entendemos por fundo público o conjunto de tributos, impostos que formam um fundo que vão garantir e permitir que o Estado construa políticas públicas.

os donos do capital, tendo em vista a tributação absurda sobre o consumo, afetando mais a renda dos/as trabalhadores/as do que do próprio capital.

Segundo Cislighi (2020) esse momento representa então a 1ª fase do neoliberalismo, o qual também tem resistência e luta, a exemplo de América Latina: o Movimento dos Sem Terra no enfrentamento ao Governo Fernando Henrique Cardoso; a luta contra a privatização da água na Bolívia; a luta contra os processos de privatização da educação no Chile, e em vários outros países.

Sendo essas resistências que levarão o capitalismo para uma nova virada, uma 2ª fase do neoliberalismo, denominada pela autora de *neoliberalismo de cooptação*, o qual se dará com a chegada das esquerdas aos Governos da América Latina, via processo eleitoral democrático, contudo, essas esquerdas mantêm o programa neoliberal, porém, com algumas concessões no âmbito das políticas sociais.

Essa faceta do neoliberalismo emerge como resposta à lutas de movimentos sociais em todo mundo no início dos anos 2000 contra os efeitos perversos desse modelo econômico. Essas lutas impulsionaram a chegada ao poder de antigos representantes de partidos da classe trabalhadora, como Lula no Brasil e Tony Blair na Inglaterra. Esse ascenso de governos chamados progressistas, principalmente na América Latina, no entanto, não reverteu e sequer interrompeu a ampliação do receituário neoliberal em sua essência. Esses governos, entretanto, apropriaram-se das pautas de reconhecimento que, associadas a políticas sociais focalizadas, cooptaram lideranças sindicais, feministas, de movimentos antirracistas e LGBTQs para a formação de um novo consenso (BEHRING; CISLAGHI; SOUZA, 2020, p. 104).

A atual crise estrutural do capital, que eclode no mundo em 2008, não se restringe a sua dimensão econômica, engloba toda a dimensão da reprodução social e seus contingentes sociopolíticos institucionais, além das dimensões que compõem a singularidade da vida cotidiana dos seres sociais, a exemplo da própria “captura” da subjetividade (ALVES, 2011). Resumidamente, essa crise atinge a esfera econômica, social e cultural da sociedade contemporânea.

O caos dessa crise e as incertezas sobre as possibilidades de atendimento das necessidades humanas mais essenciais e imediatas têm sido fermento vivo para que várias pessoas vejam o futuro como uma espécie de ameaça, já que parece que não há mais um projeto para o futuro, e assim, a saída é o retorno ao passado, tendo-o como refúgio, expressão essa que se diversifica nas diversas dimensões do ser social: escola, cultura, vida privada, trabalho, vida pública.

Assim sendo, essa crise do capital, em sua expressão mais recente, desde 2008, avança em seu caráter ultraneoliberal, predatório, de banalização da vida, contexto que vem sendo apresentado por vários

autores no campo crítico como tempos de barbárie (MÉSZÁROS, 2017), ou sendo uma face mais destrutiva da barbárie neoliberal e financeira (ANTUNES, 2020), ou seja, uma ofensiva muito exponencial tanto do ponto de vista da ordem capitalista, dos seus processos de acumulação, como também dos componentes morais e justificadores desse processo.

[...] é preciso enfatizar, o que estamos vivendo hoje não é apenas mais uma mudança de pele, não é “mais do mesmo”. E por algumas razões. Desde 2016, estamos sob um golpe de Estado de novo tipo (Demier, 2017), que tem em seu cerne o aprofundamento do ajuste fiscal, chamado de Novo Regime Fiscal, tendo em vista sinalizar ao mercado um ambiente de negócios que assegure “trabalhadores livres como os pássaros” para aceitarem qualquer trabalho precarizado; e, de outro lado, assegurar o saque ao fundo público, como um suporte imprescindível para o grande capital em tempos de crise – destacadamente os detentores de títulos da dívida pública. Este processo se combina ao saque do patrimônio público, com a retomada das privatizações, com destaque aos interesses imperialistas sobre as riquezas do país, destacadamente a água, o petróleo e a Amazônia. As medidas do governo golpista de Temer, algumas delas decididas sob bombas na Esplanada dos Ministérios, não deixam qualquer sombra de dúvida. Dentre outras, tivemos: a contrarreforma trabalhista que estimula a terceirização e precarização generalizadas do trabalho no país; a aprovação da Emenda Constitucional 95, que praticamente congela os gastos primários do governo federal fazendo com que sejam corrigidos apenas pela variação da inflação do ano anterior (em tempos de deflação e paralisação da atividade econômica) e preserva a dívida pública, a grande gambiarra de recursos públicos; e a Emenda Constitucional 93, que estendeu a desvinculação de recursos pela DRU até 2023 e a ampliou para 30%, também para estados e municípios. Temer propunha ainda uma contrarreforma da previdência, mas não teve correlação de forças para avançar, sob uma saraivada de denúncias de corrupção. Essa possibilidade só foi configurada com a legitimidade das urnas com as eleições gerais de 2018, ainda que fundada num ambiente antidemocrático, com a prisão de Lula e as fakenews, hoje sob investigação pelo STF. Ou seja, é preciso ficar claro que o ambiente político e ideológico para que medidas tão agressivas aos direitos e condições de vida e trabalho das majorias sejam tomadas, é de profundo ataque às liberdades democráticas, de uma ainda mais feroz blindagem da democracia (Demier, 2017) (BEHRING; CISLAGHI; SOUZA, 2020, p. 105).

Tal questão nos leva a afirmar que, desde a instaurada do neoliberalismo no Brasil, os Governos Temer e Bolsonaro evidenciaram o momento mais dramático para os/as trabalhadores/as: o ultraneoliberalismo,

[...] essa mais recente forma do neoliberalismo, que não se resume ao Brasil, pois pode ser observada em vários países no mundo. A maioria dos autores do campo crítico, adotando ou não esse termo, concordam que o neoliberalismo sofre uma inflexão que aprofunda seus pressupostos, como consequência da crise financeira de 2008. Apesar de a crise ser centralmente das atividades do



setor privado financeiro, e fazer parte de um momento estrutural de crise do capital que se arrasta por décadas, ela foi apresentada, mais uma vez, como uma crise do Estado, que de fato, absorveu os prejuízos do capital por meio de fundo público, com a justificativa de que bancos e instituições financeiras eram “grandes demais para quebrar” o que afetaria o conjunto da sociedade (BEHRING; CISLAGHI; SOUZA, 2020, p. 106).

Portanto, considera-se essa a 3ª fase do neoliberalismo, sendo denominado de ultraneoliberalismo, o que se funda no trinômio: 1. Aprofundamento violento da exploração do trabalho, diga-se, da precarização e “captura” da subjetividade do/a trabalhador/a; 2. Expansão da apropriação do fundo público pelo capital financeiro; 3. Privatização e expropriação de bens comuns e estatais que ainda existem.

E a expressão política mais concreta no Brasil acerca da crise estrutural do capital, sua saída ultraneoliberal e conservadorista, é a vitória de Jair Bolsonaro nas eleições presidenciais de 2018, levando assim ao palácio do planalto o que há de mais atrasado na política brasileira, com um quadro em que recrudescer a “blindagem da democracia” no Brasil (Demier, 2017), a desigualdade social e a violência, alinhada ao maior ataque aos direitos sociais, desde a instalação do neoliberalismo no Brasil.

Ou seja, o processo de ultraneoliberalização no Brasil se dá sob os auspícios de um governo neofascista, que mobiliza o medo, que mobiliza os ressentimentos dentro da própria classe trabalhadora, e mobiliza ainda os piores sentidos da formação sócio-histórica do Brasil: racista, misógina, xenófoba, machista, LGBTfóbica, ou seja, é o neoliberalismo se aprofundando sem nenhuma mediação progressista sobre nada, pelo contrário,

[...] as práticas vêm sendo reorientadas por um conservadorismo de direita, também exacerbado (que denominamos ultraconservadorismo), uma vez que recorre ao fascismo. Seria uma nova etapa do projeto neoliberal, com a conjugação de um projeto ultraconservador, que busca naturalizar desvalores, para legitimar o neofascismo e que vai repercutir - diretamente - nos estratos mais baixos da classe trabalhadora, uma vez que estes são vistos como mais dispensáveis (BORGES; MATOS, 2020, p. 80).

Assim sendo, essa intenção de reduzir o papel do Estado frente às políticas públicas se alastram durante o governo Bolsonaro que sucedeu Temer. Desde sua posse, em 2019, e durante todo seu governo, o país viveu em um acentuado afronte aos direitos sociais, trabalhistas, à própria soberania nacional, à cultura, ao meio ambiente e até as conquistas básicas de civilidade. Esse processo que começou a ser articulado, como já situado aqui, com Michel Temer e que se agravou em 2019, e a “chegada de Bolsonaro ao poder ocorreu em uma combinação de crises no plano econômico, social e político, na qual a legitimidade de um determinado

padrão de “gestão” da dominação de classes se viu profundamente abalada” (MATTOS, 2020, p.163).

Eleito dia 28 de outubro de 2018, com aproximadamente 55% dos votos válidos, Jair Bolsonaro (à época do Partido Social Liberal-PSL) assume a presidência do Brasil, classificado como ultradireitista, radical, populista e neofascista, historicamente lembrado por seus discursos violentos, preconceituosos, misóginos, racistas e xenofóbicos, vulgarizado amplamente através das mídias sociais.

Bolsonaro foi eleito em clima de polarização, de grave conturbação social e política no cenário nacional e forte repúdio ao sistema político e suas práticas, amparado pelo ambiente moralista/justiceiro da lavajato e do estilo mobilizador e confrontador do então candidato, “um cidadão de bem” sem preparo ou conhecimento das funções relevantes quanto presidente da república. O site Congresso em Foco (2021) destaca que o presidente reuniu uma equipe ultraneoliberal do ponto de vista econômico; fiscalista, do ponto de vista de gestão; conservador em termos de valores; à extrema direita, do ponto de vista político; atrasada, em relação aos direitos humanos; e refratária em relação à proteção ao meio ambiente.

Com essas características, o governo colocou em prática uma política que contraria os preceitos da Constituição de 1988, visando reduzir o papel do Estado na garantia de bens e serviços, além de concentrar o poder decisório no Executivo e desmantelar políticas públicas consideradas contrárias à visão do presidente e de sua equipe. Nessa lógica, é notório a execução de uma gestão autoritária combinada de uma desresponsabilização quanto ao seu papel político na reprodução de políticas públicas que visam a garantia de direitos, sobretudo, aquelas que atendam as vulnerabilidades mais contundentes da população, como a Política Nacional de Assistência Social.

Situação que se adensa com a pandemia do coronavírus, já que essa pandemia esteve e ainda está diretamente ligada à crise econômica-social, provocada pela expansão desenfreada e predatória do capital e do sistema capitalista. Somado ao fato de que, a crise sanitária encontra saída no capitalismo em processos de ajustes, considerando o agravamento de políticas ultraneoliberais desestruturando o sistema de Seguridade Social, especificamente o sistema público de Saúde e Assistência Social.

Araújo e Carvalho (2020) enfatizam que a pandemia da Covid19 é entendida como uma manifestação do capitalismo contemporâneo, acrescida por questões de classe, gênero e etnia. Os impactos refletidos por tal crise recaem, de forma mais acentuada sobre as camadas mais vulneráveis da sociedade, e no Brasil, os segmentos que mais sofrem são os que vivem às margens da vida social, e que mais se utilizam da Política Nacional de Assistência Social,

especificamente trabalhadores/as pobres, de comunidades periféricas, a população LGBTQIA+, mulheres e negros.

Os implacáveis impactos respingam no dia a dia desses trabalhadores/as desempregados/as, ou, naqueles, submetidos/as a trabalhos autônomos, terceirizados, precarizados, informais, sem a garantia e acesso aos direitos trabalhistas e que sobrevivem em condições insalubres. Fica nítido o impacto de todas essas dimensões de crise nas expressões da questão social, à medida que aumenta a desresponsabilização do Estado com as políticas sociais, em especial a Política de Assistência Social, quando se tem uma redução drástica de investimentos com parques repasses de recursos destinados a proteção social no país, como veremos no tópico a seguir.

### III. O DESFINANCIAMENTO DA POLÍTICA DE ASSISTÊNCIA SOCIAL NO (DES) GOVERNO BOLSONARO E O AUMENTO DAS EXPRESSÕES DA QUESTÃO SOCIAL NO BRASIL

Desde o início de seu governo, Bolsonaro vem propondo cortes em programas sociais desenvolvidos pelos governos petistas. No início de setembro de 2019, o Presidente anunciou mais cortes em diversos programas sociais, como Bolsa Família, Minha Casa Minha Vida e Fundo de Financiamento Estudantil (FIES). A maior redução se dá no programa habitacional, com orçamento de apenas R\$ 2,7 bilhões para o ano de 2020, antes estimado em R\$ 4,6 bilhões em 2019. O orçamento de Bolsonaro para o Minha Casa Minha Vida, fundado há dez anos, foi o mais curto da história, de acordo com o site Escola Nacional de Formação (2021). Além disso, desmonte parecido sofreu o Programa Bolsa Família (PBF), com recursos congelados desde 2016 e uma alta significativa na fila de acesso ao benefício.

Aos poucos o Programa Bolsa Família foi sendo atacado até sua extinção naquele governo, a exemplo da própria portaria nº 2.362 publicada em dezembro de 2019 pelo Ministério da Cidadania, donde constam alguns dos cortes de verbas destinados aos serviços da Assistência Social no país. Esta portaria impactou diretamente cada município, variando de 30% a 40% para menos a viabilização de recursos. O corte aconteceu durante uma conjuntura de enxugamento do principal programa de transferência de renda do Brasil, o que refletiu direta e indiretamente nos Centros de Referência da Assistência Social (CRAS's) que prestam serviços de encaminhamento e de garantia de acesso às famílias e indivíduos que possuem direito a esses programas.

Na segunda metade do ano de 2020, o governo estudou a possibilidade de aumentar o valor

do repasse mensal do Bolsa Família, em pouco mais de R\$ 50,00. Dos antigos R\$ 191,00 (média por família que recebe) passaria para R\$ 247,00. A falácia do governo Bolsonaro é de acabar com outros benefícios considerados "ineficientes" e implementar programas que possam realmente mudar a realidade dos indivíduos, a exemplo da criação do então Auxílio Brasil, extinguindo o único programa de transferência de renda do país, o PBF. O Auxílio Brasil desconsidera uma parte das condicionalidades do PBF, e ainda infere na quantidade mensal do repasse a família e também na durabilidade do próprio programa, uma vez que o Auxílio Brasil teve vigência temporária até o final de 2022.

Assim como estes programas, a Política Nacional de Assistência Social como um todo esteve no cerne do processo de dismantelamento. As transferências do Governo Federal para os municípios caíram de pouco mais de três bilhões de reais no final da presidência de Dilma para pouco mais de um bilhão e meio de reais em 2020. O orçamento indicado pelo Conselho Nacional de Assistência Social (CNAS) para 2021, destinado ao custeio dos serviços e ações sócioassistenciais, foi de 2.6 bilhões, mas teve uma aprovação efetiva de apenas R\$ 1.1 bilhões, com redução, então, de 59,34%. Com isso, os pilares do Sistema Único de Assistência Social (SUAS)<sup>3</sup>, como componente estratégico da seguridade social, ficaram comprometidos.

Inúmeros ataques foram implementadas na rede de proteção dos serviços do SUAS, a exemplo das várias tentativas de encerrar com o Benefício de Prestação Continuada (BPC), incluindo emendas constitucionais e outras iniciativas legais, tanto por Temer quanto por Bolsonaro. A primeira proposta de reforma da Previdência previa alterações na idade mínima para ter direito ao benefício, aumentando de 65 para 70 anos se a proposta tivesse sido aprovada. A outra mudança era a desvinculação do salário-mínimo. A proposta só não foi aprovada porque houve resistência tanto da oposição quanto dos movimentos das categorias, o que levou as alterações saírem do texto da nova contrarreforma da Previdência.

Após não conseguir incluir a redução do BPC na Reforma da Previdência, o governo Bolsonaro começou a desorganizar os serviços e dificultar o acesso pela população. Desinformação, restrições – como o acesso online, dificultoso para um idoso –, e mudanças do sistema de perícia. Ao analisar a concessão de novos benefícios, durante 2014 até 2019

<sup>3</sup> O SUAS é uma porta de entrada ao sistema de proteção e acesso aos direitos às populações vulneráveis, em particular, o SUAS organiza uma rede de proteção de renda e de acesso a serviços sócioassistenciais, garantindo ainda a inclusão em um amplo conjunto de proteções e referenciamento em serviços como saúde e educação.



a média caiu drasticamente de 83 mil novos beneficiários para menos de 14 mil (OBSERVABR, 2021).

Neste íterim, o que observamos é uma Política de Assistência Social devastada por esses governos, por meio de seu desfinanciamento em diversas frentes, a contar com aquela de 2019, na qual a proposta inicial da Lei Orçamentária Anual (LOA) enviada pelo Governo Federal, já durante a gestão de Jair Bolsonaro, na qual a destinação de verbas do orçamento para a Assistência Social foi de aproximadamente R\$ 1,64 bilhões, somados mais de R\$ 280,1 milhões em emendas parlamentares (diga-se, orçamento secreto), totalizando em 2019 a destinação de cerca de R\$1,92 bilhões para a Assistência Social (AGÊNCIA CÂMARA DE NOTÍCIAS, 2019).

Cenário que em 2021 muda, com uma proposta inicial advinda também do Poder Executivo, de cerca de R\$ 1,04 bilhões e mais da metade deste valor, aproximadamente R\$ 776,7 milhões em emendas parlamentares, complementado R\$ 1,82 bilhões para a Assistência Social. Isso implica em uma notória desresponsabilização e diminuição do orçamento para a promoção desta política, ficando visivelmente insuficiente quando pensada a garantia da qualidade e efetividade dos serviços em momentos de crise sanitária, econômica e político-social.

Todos os indicadores realçam o agravamento dessa tríplice crise no país, e eventualmente o aumento exponencial das taxas de desemprego, inflação, fome, miséria, pessoas em situações de vulnerabilidade e as profusas expressões da questão social. Uma vez que em 2021, o Brasil ficou acima da média mundial no que tange o quadro de insegurança alimentar, com um índice de 36% em comparação com a média mundial de 35% (FGV, 2022). Nesse mesmo período o quadro de pobreza no país triplicou, atingindo mais de 27 milhões de brasileiros que viviam/vive abaixo da linha de pobreza, aproximadamente 12,8% de toda a população do Brasil. A pesquisa ainda revela que o rendimento médio das famílias em situação de extrema pobreza é cerca de R\$ 246,00 no mês, em um momento de ausência de políticas públicas que deveriam ter facilitado o acesso à renda, ainda mais com os altos índices de inflação e o elevado nível de desemprego, condicionando um cenário de empobrecimento nunca visto antes.

No ano de 2014 a média de desocupação era cerca de 7,2% , historicamente uma das menores do Brasil, a partir das novas normativas e ideologia ultraneoliberal e mudança da lógica do trabalho mesclada com as inúmeras contrarreformas implementadas através ilegítimo governo de Michel Temer e aprofundadas por Bolsonaro, esse índice piorou drasticamente (IDEM, 2022).

O estreitamento das relações entre empregado e empregador, a flexibilização da jornada de trabalho

quando acoplada ao descumprimento das legislações trabalhistas sem a garantia de direitos, colaborou para que em 2017 os índices de desemprego batessem mais de 13,7%, seguindo um aumento linear ao passar dos anos. Resultante desse período, somado ao agravamento causado pela má gestão do Executivo durante a pandemia, o Brasil enfrentou recordes de desemprego, chegando a mais de 14,8 milhões de pessoas com uma taxa de aproximadamente 14,7% (IBGE, 2022).

#### IV. CONSIDERAÇÕES FINAIS

Assim sendo, o que vivemos no período Temer-Bolsonaro foi o aprofundamento dos determinantes da crise estrutural do capital, que no Brasil se conformou em uma tríplice crise, e sua insidiosa corrosão no campo das políticas sociais e do Estado brasileiro, apropriado pelo ultraneoliberalismo e por um governo ultraconservador, de face reacionária, obscurantista, que negou a ciência e teve como ideário político a violência, o preconceito e a intolerância contra “os de baixo”, próprios da cultura autocrática burguesa brasileira.

A somatória desses índices revela e representa o escancarado agravamento das expressões da questão social no país, outrora com os impactos advindos dessa crise refletem diretamente no quadro de desigualdade social. Como ilustra a CNN Brasil (2021) dos 20% da parcela da população mais pobre do país a fome aumentou 22 pontos percentuais, ou seja, saiu de 53% para 75%, mais de 27% acima da média mundial, se aproximando de índices de países extremamente pobres como a África, por exemplo. Em contrapartida, durante os anos de 2019 e 2021, a insegurança alimentar caiu de 10% para 7% entre parcela da população mais rica do Brasil, ilustrando a real desigualdade do que ainda enfrenta o país.

Para tanto, no que tange a esfera da Política de Assistência Social, percebemos que seu desfinanciamento e o consequente agravo das expressões da questão social assolam a população mais vulnerável do país, mesmo tendo ciência de que as contradições encontradas na política não serão solucionadas nas singularidades de uma sociedade capitalista. Entretanto, a política assume um papel fundamental na mínima garantia de direitos sociais àqueles que se encontram em situações de subalternização, sendo um elemento indispensável na superação das desigualdades e na busca da emancipação dos sujeitos, validando a defesa intransigente do sistema de proteção social em um cenário de desvalorização e fragmentação de serviços públicos.

Sem dúvida, Bolsonaro atingiu seu objetivo de desconstruir, destruir e dismantelar as políticas sociais públicas no Brasil. Cumpriu com suas promessas,



manteve sua agenda de desmontes (também conhecida como agenda de contrarreformas), o teto de gastos, outras obrigações financeiras, e, contraditoriamente, as usou como justificativa para a proteção familiar e a inadequada resposta a crises de saúde pública, onde o resultado está aí: uma realidade de miséria e fome, que ainda afeta (e, acreditamos que afetará por certo período), grande parte da população, e que mesmo com a chegada do Governo Lula ainda se tem muito para (re)construir, pelo menos para se chegar aos patamares de combate à pobreza e a miséria à época do golpe contra a Dilma Rouseff.

## REFERENCES RÉFÉRENCES REFERENCIAS

1. AGÊNCIA CÂMARA DE NOTÍCIAS. IN: *Consultora da Câmara aponta queda do gasto do governo federal com assistência social*. Fonte: Agência Câmara de Notícias. Brasília, 19 out. 2021. Disponível em: <https://www.camara.leg.br/noticias/818018>. Acesso em: 20 jun. 2022.
2. ALVES, Giovanni. *Trabalho e subjetividade: o espírito do toyotismo na era do capitalismo manipulatório*. São Paulo: Boitempo, 2011.
3. ANTUNES, Ricardo. *Os sentidos do trabalho: Ensaio sobre a afirmação e a negação do trabalho*. São Paulo: Boitempo, 1999.
4. ANTUNES, Ricardo. Trabalho intermitente e uberização do trabalho no limiar da indústria 4.0. In: ANTUNES, Ricardo (Org.). *Uberização, trabalho digital e indústria 4.0*. 1. ed. São Paulo: Boitempo, 2020a.
5. ARAÚJO, Maria do Socorro Sousa de; CARVALHO, Alba. Coronavírus e bolsonarismo: uma dupla pandemia no Brasil do presente. In: ARAÚJO, MS. S et al. *Crise humanitária, bolsonarismo e (des)proteção social no Brasil do presente: particularidades da Política Nacional de Assistência Social*. Anais do III Simpósio Internacional de Políticas Públicas (III SINESPP), Teresina, outubro de 2020.
6. BEHRING, Elaine Rossetti; CISLAGHI, Juliana Fiúza; SOUZA, Giselle. Ultraneoliberalismo e bolsonarismo: impactos sobre o orçamento público e a política social. In: BRAVO, Maria Inês Souza; MATOS, Maurílio Castro de; FREIRE, Silene de Moraes (Orgs.). *Políticas Sociais e Ultraneoliberalismo*. Uberlândia: Navegando Publicações, 2020.
7. BORGES, Maria Elizabeth S.; MATOS, Maurílio Castro de. As duas faces da mesma moeda: ultraneoliberalismo e ultraneoliberalismo no Brasil da atualidade. In: BRAVO, Maria Inês Souza; MATOS, Maurílio Castro de; FREIRE, Silene de Moraes (Orgs.). *Políticas Sociais e Ultraneoliberalismo*. Uberlândia: Navegando Publicações, 2020.
8. BRAGA, Ruy. *A política do precariado: do populismo a hegemonia lulista*. São Paulo: Boitempo; EDUSP, 2012.
9. CISLAGHI, Juliana Fiúza. Do neoliberalismo de cooptação ao ultraneoliberalismo: respostas do capital à crise. *Esquerda Online*, 2020. Disponível em: < [https://www.google.com/search?q=cita%C3%A7%C3%A3o+de+site+abnt&rlz=1C1ISCS\\_pt-P\\_TBR953BR953&oq=cita%C3%A7%C3%A3o+de+site+&aqs=chrome.1.69i57j0i512l9.3533j0j7&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=cita%C3%A7%C3%A3o+de+site+abnt&rlz=1C1ISCS_pt-P_TBR953BR953&oq=cita%C3%A7%C3%A3o+de+site+&aqs=chrome.1.69i57j0i512l9.3533j0j7&sourceid=chrome&ie=UTF-8)>. Acesso em 26 de jul. de 2022.
10. CNN BRASIL. *População abaixo da linha da pobreza triplica e atinge 27 milhões de brasileiros*. [S. L.], 08 de abr. 2021. Disponível em: <<https://www.cnnbrasil.com.br/nacional/populacao-abaixo-da-linha-da-pobreza-triplica-e-atinge-27-milhoes-de-brasileiro-s/>>. Acesso em: 14 de jun. 2022.
11. DEMIER, Felipe. *Depois do golpe: a dialética da democracia blindada no Brasil*. Rio de Janeiro: Mauad, 2017.
12. FGV, FUNDAÇÃO GETÚLIO VARGAS. *Social lança a pesquisa "insegurança alimentar no Brasil"*. 2022. Disponível em: <https://cps.fgv.br/destaques/fgv-social-lanca-pesquisa-inseguranca-alimentar-no-brasil>. Acesso em: 20 jan. 2023.
13. IBGE, Instituto Brasileiro de Geografia e Estatística (ed.). *Desemprego: taxa de desocupação no Brasil e nas grandes regiões*. Taxa de Desocupação no Brasil e nas Grandes Regiões. 2022. Disponível em: <https://ibge.gov.br/explica/desemprego.php>. Acesso em: 13 jan. 2023.
14. LÖWY, Michael. *O que é Cristianismo da libertação: religião e política na América Latina*. 2a. ed. São Paulo: Editora Fundação Perseu Abramo: Expressão Popular, 2016.
15. MATTOS, Marcelo B. *Classes sociais e luta de classes: a atualidade de um debate conceitual*. Em Pauta. Teoria Social e Realidade Contemporânea. FSS/UERJ, n. 20, nov. 2020
16. MÉSZÁROS, István. *O século XXI: Socialismo ou barbárie?* São Paulo: Boitempo Editorial, 2017.
17. OBSERVABR. *Políticas sociais sob Bolsonaro: rumo à década de 1990*, 2021. Disponível em: <<https://fpabramo.org.br/observabr/2021/01/13/politicas-sociais-sob-bolsonaro-rumo-a-decada-de-1990/>>. Acesso em: 11 abr. 2022
18. RETROCESSOS DO GOVERNO BOLSONARO. *Escola Nacional de Formação*, 2022. Disponível em: < <https://www.enfpt.org.br/retrocessos-do-governo-bolsonaro/>>. Acesso em: 10/04/2022.



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## *Helicobacter Pylori*: Factors Related to Therapeutic Resistance and Current Approaches

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**Keywords:** *antibacterial resistance; bacterial disease; chronic gastritis; dual therapy for H. pylori.*

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*Strictly as per the compliance and regulations of:*



# Helicobacter Pylori: Factors Related to Therapeutic Resistance and Current Approaches

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**Results:** After the selection considering the inclusion and exclusion criteria, 17 articles fulfilled the defined criteria. The selected references were mainly from Brazil, Vietnam, Chile, China, Thailand, the United States, and Europe. They highlight the growing antimicrobial resistance, particularly against the first-line antibiotic, clarithromycin. Traditional triple therapies face growing compromise, necessitating alternative approaches. Vonoprazan (VPZ)-amoxicillin dual therapy stands out for acceptable eradication rates, reduced resistance risk, and enhanced safety. Effective regimens include bismuth-free quadruple therapies and VPZ-based triple therapy, proving efficacy even in high-resistance regions. Clarithromycin resistance, particularly in gastric remnants, raises concerns about traditional triple therapy. Resistance rates to metronidazole and clarithromycin underscore the importance of considering local resistance profiles when selecting treatments. More research into the actions of drugs against *H. pylori* is needed to help reduce future levels of antimicrobial resistance and minimize the significant impact on the gut microbiota.

**Keywords:** antibacterial resistance; bacterial disease; chronic gastritis; dual therapy for *H. pylori*.

*Therapeutic resistance of Helicobacter pylori*

## 1. INTRODUCTION

The *Helicobacter pylori* (*H. pylori*) is a spiral, rod-shaped, microaerophilic, Gram-negative bacterium. This microorganism has exceptional adherence capacity and is adapted to the harsh

conditions of the stomach, and can cause, in infected individuals, chronic gastritis, gastric ulcers, lymphoma of the lymphoid tissue associated with the gastric mucosa and, in some cases, distal gastric adenocarcinoma.<sup>1-3</sup>

Hooi et al.<sup>4</sup> determined that around 4.4 billion people would be infected by *H. pylori* by the end of 2015. Among the regions studied, the highest infection rates were recorded in Africa and Latin America/Caribbean. Oceania had the lowest prevalence, illustrating an inversely proportional relationship between urbanization and infection prevalence. On the other hand, Switzerland, with one of the areas of lowest global prevalence, has around 1.6 million people remaining infected, thus highlighting *H. pylori* as a global public health challenge.<sup>4,5</sup>

Therapeutic success is influenced by various environmental and host-related factors, such as non-adherence to treatment and polymorphisms in interleukin 1B (IL-1B) and enzymes involved in drug metabolism (CYP2C19 and CYP3A4). However, the primary cause of treatment failure, especially in the case of bacteria, is bacterial resistance.<sup>6</sup> As such, in February 2017, the World Health Organization (WHO) added *H. pylori* to the list of 16 microorganisms that threaten humanity and called for urgent implementation of control measures. *H. pylori* has been prioritized due to the progression of antibiotic resistance and the emergence of multidrug-resistant strains.<sup>7</sup>

Currently, the success rates for most therapies for *H. pylori* are relatively low. The increase in antimicrobial resistance has rendered empirical triple therapies [a proton pump inhibitor (PPI) + amoxicillin + clarithromycin or metronidazole or levofloxacin] ineffective.<sup>8</sup> The prevalence of resistance to these antibiotics has been increasing, resulting in reduced effectiveness of eradication therapies.<sup>9-11</sup> Other factors include poor patient adherence to treatment regimens, low gastric pH, high bacterial load, and rapid metabolism of proton pump inhibitor drugs. Additionally, the presence of genetic polymorphisms in CYP2C19 can influence treatment outcomes. In view of all this, it is clear that when selecting the drug therapy to be used, the local resistance profiles and the success rates of the eradication therapy to be used must be considered.<sup>9,10,12</sup>

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Other treatment recommendations for *H. pylori* include the prescription of at least one antibiotic that does not contribute to the treatment outcome. This practice contributes to the overall resistance to antibiotics. Examples include popular four-drug regimens known as simultaneous, sequential, or hybrid therapies. For example, concurrent therapy involves combining triple therapies with clarithromycin and metronidazole in a regimen that includes amoxicillin, clarithromycin, and metronidazole along with a PPI, hoping that the *H. pylori* may be susceptible to either clarithromycin or metronidazole. This practice of using double, triple or quadruple medications to treat *H. pylori* can result in the production of 14,000 kilograms of unnecessary antibiotics for every 1 million successful treatments and 28,000 kilograms for every 1 million treatment failures.<sup>8</sup>

Considering the clinical-epidemiological significance of *H. pylori* infection globally, including its status as a WHO intervention priority, and the need to discuss the pharmacological management of the disease, this study aimed to identify current drug therapies in treating *H. pylori* about antimicrobial resistance.

## II. MATERIALS AND METHODS

A literature review was conducted involving the search for scientific articles in the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), US National Library of Medicine (PubMed), Virtual Health Library (BVS), and Scientific Electronic Library Online (SciELO). The following descriptors were used in combination with the Boolean operator "AND": "*Helicobacter pylori*", "*H. pylori*", "drug treatment", "bacterial pharmacoresistance" and "drug resistance".

National and international articles published between 2019 and 2023 were examined. The inclusion criteria established for article selection were: language (Portuguese, English or Spanish); publication time (only the last five years); and availability of full articles for

download. The articles excluded from the study addressed the presence of multiple infectious agents, duplicate articles in the databases, not accessible in full to researchers, or without discussion related to bacterial resistance to drugs in the treatment of *H. pylori* infection.

The process of studying the selected references included compiling relevant texts, creating detailed notes, analyzing and interpreting the data and, finally, consolidating the results. The purchased articles were organized into a general summary table, including the publication titles, authorship/year, study type, objectives, and results. This table was designed to summarize information during the data collection phase, simplifying the analysis, comparison, and discussion of the information from the chosen articles.

The current study analyzed thirty-six (36) articles published within five years to create a literature review on the therapeutic resistance of *H. pylori*. However, relevance criteria were applied, leading to the exclusion of fourteen (14) articles due to content repetition, and five (5) articles were excluded for deviating from the specific theme of the review.

Each article was scrutinized, focusing on extracting the most relevant information related to bacterial resistance and therapy descriptors concerning *H. pylori*, emphasizing up-to-date treatment methodologies.

## III. RESULTS

Most of the articles used in this study (16) were obtained from the PubMed database and one from Medline. Table 1 shows the results of the characterization of the reviewed articles. The studies were conducted in different countries, most frequently in Brazil, Vietnam, Chile, China, Thailand, the United States, and Europe. Regarding treating *H. pylori* infection, studies have indicated that the most commonly used regimen was a combination therapy of vonoprazan (VPZ) and amoxicillin.

**Table 1:** Methodological characteristics of selected studies on drug therapies used in treating *H. pylori* about antibacterial resistance.

Title	Author/ year	Type of Study	Study objective	Results	Database
Effectiveness and safety of high-dose esomeprazole-amoxicillin dual therapy as a rescue treatment for <i>Helicobacter pylori</i> infection: a multicenter, prospective, randomized, and controlled trial	Bi et al. <sup>10</sup>	Randomized controlled trial	To compare the effectiveness and safety of high-dose PPI-amoxicillin dual therapy versus bismuth-containing quadruple therapy for the rescue treatment of <i>H. pylori</i> infection	The 14-day high-dose dual therapy (HDDT), which includes esomeprazole (40 mg) and amoxicillin (1000 mg) taken thrice daily, is not less effective than the traditional quadruple therapy that contains bismuth for eradicating <i>H. pylori</i> . Additionally, HDDT has fewer side effects and good patient adherence, making it a promising alternative rescue treatment for <i>H. pylori</i> in the local region.	PubMed



Quadruple therapy with vonoprazan 20 mg daily as a first-line treatment for <i>Helicobacter pylori</i> : A single-center, open-label, randomized, controlled, non-inferiority trial	Lu et al. <sup>13</sup>	Randomized controlled trial	To assess the effectiveness, tolerability, and cost-effectiveness of quadruple therapy with 20 mg of VPZ per day as first-line treatment for the eradication of <i>H. pylori</i> .	Quadruple therapy with VPZ at 20 mg per day was not inferior to the esomeprazole-based regimen	PubMed
The effectiveness of quadruple therapy with bismuth, sequential therapy, and hybrid therapy as first-line treatments for <i>Helicobacter pylori</i> infection compared to standard triple therapy	Koroglu et al. <sup>14</sup>	Retrospective study	To compare the effectiveness of <i>H. pylori</i> treatment regimens.	In terms of eradication, the TH regimen (esomeprazole 40 mg orally twice daily and amoxicillin 1000 mg orally twice daily; in the second week, esomeprazole 40 mg orally twice daily, amoxicillin 1000 mg orally twice daily, clarithromycin 500 mg orally twice daily, and metronidazole 500 mg orally twice daily were used) had the highest success rate. In contrast, the lowest success rate was observed in the sTT treatment group (lansoprazole 30 mg twice daily, amoxicillin 1000 mg twice daily, and clarithromycin 500 mg twice daily for 2 weeks). This study does not recommend the use of sTT due to the low eradication rates. This study recommends HT to overcome antibiotic resistance and achieve better outcomes.	PubMed
Surveillance of antibiotic resistance in <i>Helicobacter pylori</i> in the Biobío region (Chile) over a decade.	Parra-Sepúlveda et al. <sup>15</sup>	Surveillance study	To report on 10 years of surveillance of primary antibiotic resistance in clinical isolates of <i>H. pylori</i> from the Biobío region in Chile, examining the changes in resistance to amoxicillin, clarithromycin, levofloxacin, metronidazole, and tetracycline among the species.	Clinical isolates of <i>H. pylori</i> are mostly susceptible to amoxicillin and tetracycline but less susceptible to levofloxacin. Conversely, metronidazole continues to show the highest score of resistant isolates. Clarithromycin has an increased frequency of isolated resistant strains. Data suggests that isolates resistant to amoxicillin, clarithromycin, and metronidazole were more commonly found in females.	PubMed
Triple and dual therapy with vonoprazan for <i>Helicobacter pylori</i> infection in the United States and Europe. Randomized clinical trial	Chey et al. <sup>16</sup>	Clinical trial	To assess the effectiveness of VPZ, a potassium-competitive acid blocker, compared to standard treatment in eradicating <i>H. pylori</i> in the United States and Europe.	Eradication rates were as follows for non-resistant strains: triple therapy with VPZ, 84.7%; dual therapy, 78.5%; triple therapy with lansoprazole, 78.8%. Eradication rates were as follows for clarithromycin-resistant infections: triple therapy with VPZ, 65.8%; dual therapy, 69.6%; triple therapy with lansoprazole, 31.9%. In all patients, both triple and dual VPZ therapy were more effective than triple lansoprazole therapy	Pubmed
Vonoprazan and amoxicillin at low or high doses for fourteen days as a dual therapy to eradicate <i>Helicobacter pylori</i> infection: A prospective, open-label, randomized, non-inferiority clinical trial.	Hu et al. <sup>17</sup>	Randomized controlled trial	To explore the effectiveness of 14-day dual therapy with VA as a first-line treatment for <i>H. pylori</i> infection.	A total of 154 patients were evaluated, and 110 individuals were randomized. The eradication rates of VPZ with amoxicillin twice daily or thrice daily for 14 days were 89.1% and 87.3%, respectively, according to the intention-to-treat analysis, and 94.1% and 95.9%, respectively, according to the per-protocol analysis.	PubMed
Tegoprazan-based triple therapy, a new potassium-competitive acid blocker as a first-line treatment for <i>Helicobacter pylori</i> infection: a phase III randomized, double-blind, clinical trial	Choi et al. <sup>18</sup>	Clinical trial	To assess the effectiveness and safety of tegoprazan as a component of the first-line triple therapy for eradicating <i>Helicobacter pylori</i> .	TPZ (Tegoprazan-based triple therapy 50 mg) is as effective and safe as PPI-based triple therapy for first-line eradication therapy for <i>H. pylori</i> . However, it does not overcome clarithromycin resistance in <i>H. pylori</i> in Korea.	PubMed

<p>Tetracycline-levofloxacin versus amoxicillin-levofloxacin as second-line quadruple therapies for treating <i>Helicobacter pylori</i> infection.</p>	<p>Hsu et al.<sup>19</sup></p>	<p>Randomized controlled trial</p>	<p>To investigate the effectiveness of quadruple tetracycline-levofloxacin (TL) therapy and quadruple amoxicillin-levofloxacin (AL) therapy as second-line treatments for <i>H. pylori</i> infection.</p>	<p>TL quadruple therapy achieved a significantly higher eradication rate than AL quadruple therapy. A detailed analysis showed that TL quadruple therapy achieved a high eradication rate for both levofloxacin-susceptible and resistant strains (100% and 88.9%). In contrast, AL quadruple therapy achieved a high eradication rate for levofloxacin-susceptible strains (90.9%) but exhibited poor effectiveness in eradicating levofloxacin-resistant strains (50.0%). The two therapies had similar rates of adverse events (37.5% vs 21.4%) and treatment adherence (98.2% vs 94.6%).</p>	<p>PubMed</p>
<p>Assessment of the safety and pharmacokinetics of quadruple therapy containing bismuth with vonoprazan or lansoprazole for eradicating <i>Helicobacter pylori</i></p>	<p>HUH et al.<sup>9</sup></p>	<p>Randomized controlled trial</p>	<p>To compare the safety and pharmacokinetics (PK) of bismuth when used in quadruple therapy with either VPZ or lansoprazole in <i>H. pylori</i>-positive individuals</p>	<p>A total of 30 individuals were randomized, and 26 completed the study (12 and 14 in the VPZ and lansoprazole groups, respectively). Systemic exposure to bismuth in the two treatments was comparable (~5% difference). All individuals tested negative for <i>H. pylori</i> at the follow-up visit. Systemic exposure to bismuth was similar between the quadruple therapy containing VPZ and lansoprazole. Quadruple therapy containing VPZ was safe and well-tolerated.</p>	<p>PubMed</p>
<p>Antibiotic resistance profile of <i>Helicobacter pylori</i> to 14 antibiotics: a multicenter study in Fujian, China.</p>	<p>Huang et al.<sup>20</sup></p>	<p>Clinical trial</p>	<p>To investigate the antibiotic resistance of <i>H. pylori</i> in Fujian, China.</p>	<p>In Fujian, there was a high prevalence of <i>H. pylori</i> resistance to azithromycin, clarithromycin, and levofloxacin, while resistance to amoxicillin, amoxicillin-clavulanate, and gentamicin was relatively low. The main patterns of dual resistance were exhibited by clarithromycin plus metronidazole (10/205, 5%) and clarithromycin plus levofloxacin (9/205, 4%). The main triple resistance pattern was toward clarithromycin+metronidazole+levofloxacin (15/205, 7%).</p>	<p>MEDLINE</p>
<p>High rates of resistance to clarithromycin and levofloxacin in <i>Helicobacter pylori</i> among patients with chronic gastritis in Southeast Vietnam.</p>	<p>Dang et al.<sup>21</sup></p>	<p>Clinical trial</p>	<p>To determine the rates of clarithromycin and levofloxacin-resistant <i>H. pylori</i> strains using the E-test method and to assess the risk factors for antibiotic resistance among patients with chronic gastritis in the southeastern region of Vietnam.</p>	<p>The resistance rates of <i>H. pylori</i> to CLR and levofloxacin were 72.6% and 40.5%, respectively. <i>H. pylori</i> with dual resistance (to both clarithromycin and LVX) accounted for 30.7% of patients. The high-level resistance rates for clarithromycin and levofloxacin were 18.9% and 83.9%, respectively.</p>	<p>PubMed</p>
<p>Emergence of amoxicillin resistance and identification of new mutations in the <i>pbp1A</i> gene in <i>Helicobacter pylori</i> in Vietnam.</p>	<p>Tran et al.<sup>22</sup></p>	<p>Clinical trial</p>	<p>To explore the prevalence of primary resistance of <i>H. pylori</i> to amoxicillin and to assess its association with point mutations in the <i>pbp1A</i> gene in Vietnamese patients.</p>	<p>The E test was used to determine the susceptibility to amoxicillin (minimum inhibitory concentration [MIC] ≤ 0.125 µg/ml) in 101 isolates, among which the rate of strains primarily resistant to amoxicillin was 25.7%.</p>	<p>PubMed</p>

Fourteen-day high-dose triple therapy with amoxicillin and metronidazole, with or without bismuth, as a first-line treatment for <i>Helicobacter pylori</i>	Luo et al. <sup>23</sup>	Randomized clinical trial	To identify the additional benefit/role of bismuth in amoxicillin, metronidazole, PPI, and bismuth quadruple therapy for the treatment of <i>Helicobacter pylori</i> ( <i>H. pylori</i> ).	Both therapies achieved high eradication rates (triple therapy involving amoxicillin and metronidazole for 14 days, consisting of 20 mg esomeprazole twice daily, 1 g amoxicillin, and 400 mg metronidazole both taken thrice daily, with or without 220 mg of bismuth twice daily). Resistance to metronidazole did not affect the effectiveness of any of the therapies. Neither the presence nor absence of resistance to bismuth or metronidazole reduced the effectiveness of the triple therapy containing 20 mg esomeprazole twice daily, 1 g amoxicillin, and 400 mg metronidazole thrice daily in this population.	PubMed
A "new" option in eradicating <i>Helicobacter pylori</i> : high-dose amoxicillin dual therapy outperforms bismuth quadruple therapy in settings with high dual resistance	Macedo Silva et al. <sup>24</sup>	Prospective randomized study	To compare the effectiveness of quadruple therapy with bismuth and high-dose amoxicillin dual therapy in eradicating <i>H. pylori</i> .	When compared to BQT (bismuth 140 mg + metronidazole 125 mg + tetracycline 125 mg, taken four times a day for 10 days), the treatment involving HDADT (alternating amoxicillin 1000 mg with amoxicillin 500 mg, taken four times a day for 14 days), both combined with esomeprazole 40 mg, showed superior effectiveness, nearly 100% in eradicating <i>H. pylori</i> . There were no reported differences in side effects or patient adherence between the two treatments. This treatment is an important alternative for populations experiencing increasing resistance to the currently recommended antibiotic regimens.	PubMed
Bismuth-based quadruple therapy versus high-dose metronidazole triple therapy as a first-line treatment for clarithromycin-resistant <i>Helicobacter pylori</i> infection: a randomized, multicenter controlled trial.	Seo et al. <sup>25</sup>	Clinical trial	To compare the effectiveness and cost-effectiveness of 14-day bismuth-based quadruple therapy versus 14-day intensified triple therapy with metronidazole for clarithromycin-resistant <i>H. pylori</i> infection with genotypic resistance.	The 14-day bismuth-based quadruple therapy was as effective as the intensified 14-day triple therapy with metronidazole and was more cost-effective in treating clarithromycin-resistant <i>H. pylori</i> infection.	PubMed
Pilot studies on <i>Helicobacter pylori</i> eradication therapy that includes vonoprazan indicate that Thailand might have more in common with the United States than with Japan in this regard	Ratana-Amornpin et al. <sup>26</sup>	Clinical trial	To examine VPZ therapies in the treatment of <i>H. pylori</i> in Thailand.	Triple therapy with high doses of VPZ and triple therapy with VPZ plus bismuth can be used as first-line treatments in certain regions showing high effectiveness, regardless of CYP3A4/5 genotype and clarithromycin resistance.	PubMed
Primary <i>H. pylori</i> strains resistant to clarithromycin and virulence genotypes in the Northeast region of Brazil.	BENIGNO et al. <sup>27</sup>	Clinical trial	To assess the prevalence of the primary resistance of <i>H. pylori</i> to clarithromycin and its association with virulence factors in adult patients with dyspepsia and asymptomatic children.	Primary resistance to clarithromycin was lower than that reported in Southeast Brazil. The positive <i>H. pylori</i> samples have few point mutations suggesting that individuals infected with virulent strains may be more susceptible to anti- <i>H. pylori</i> treatment.	PubMed

IV. DISCUSSION

Research has shown that VPZ-amoxicillin (VA) dual therapy offers acceptable eradication rates, improves safety and tolerability, and reduces the potential for increased antimicrobial resistance or an

imbalance in the gut microbiota.<sup>18,28,29</sup> Quadruple therapy with VPZ was found to be safe and well-tolerated.<sup>9,10,22,30</sup>

High-dose dual therapy consisting of amoxicillin and a PPI has also been suggested as an effective and safe first-line or rescue treatment, showing eradication

rates that are comparable to or better than traditional triple therapy.<sup>10,22,24,30</sup> Therefore, the choice of therapy depends on factors such as antibiotic resistance rates and individual patient characteristics.<sup>10,22</sup>

Other recommended treatment regimens include 10-14 days of bismuth-free quadruple therapies and a 7-day VPZ-based triple therapy, which have shown high eradication rates even in areas with high antimicrobial-resistant strains.<sup>16,26,31</sup> Quadruple therapy with bismuth has been confirmed as an effective treatment, particularly against antibiotic-resistant strains.<sup>25</sup>

Recently, Ko et al.<sup>32</sup> conducted a systematic review and meta-analysis to assess the effectiveness of non-antibiotic supplements (bismuth) as a first-line treatment for eradicating *H. pylori*. In total, 25 randomized trials (3,990 patients) were included for analysis. According to the per-protocol (PP) analysis, the *H. pylori* eradication rate was significantly higher in the BQT regimen group (85.8%) than in the non-BQT regimen group (74.2%).<sup>32</sup>

The most commonly prescribed therapy worldwide for *H. pylori*, known as triple therapy, combines PPIs, amoxicillin, and clarithromycin.<sup>18</sup> However, the effectiveness of triple therapy can be impacted by antibiotic resistance, particularly to clarithromycin.<sup>17</sup> In patients with gastric remnants, *H. pylori* strains showed resistance rates to metronidazole, clarithromycin, levofloxacin, amoxicillin, and furazolidone of 100%, 20.63%, 22.22%, 0%, and 0%, respectively.<sup>33</sup>

Clarithromycin is a bacteriostatic macrolide antibiotic that inhibits bacterial growth by restricting protein synthesis. Macrolides bind to the 50S ribosomal subunit (through 23S rRNA) and prevent proliferation. The resistance to clarithromycin has been increasing, possibly due to the use of macrolides for other community-acquired infections.<sup>34,35</sup> Resistance to metronidazole is linked to mutations in the RdxA and FrxA genes, which reduce the effectiveness of its reductase activity. Mutations—such as frameshifts, missense mutations, and premature termination in the rdxA and frxA genes—have been reported in metronidazole-resistant *H. pylori*.<sup>36</sup>

In Brazil, the Fourth consensus on *H. pylori* infection, organized by the Brazilian Nucleus for the Study of *H. pylori* and Microbiota in 2017, indicates that despite increasing resistance to clarithromycin and fluoroquinolones in Brazil, their use is still recommended for treating *H. pylori*. The recommended first-line treatment is triple therapy consisting of a PPI, amoxicillin, and clarithromycin for 14 days. Alternatives include 10 to 14-day quadruple therapy with bismuth and 14-day concomitant treatment. If triple therapy with clarithromycin or concomitant quadruple treatment fails, the recommended strategies are triple therapy with levofloxacin or quadruple therapy with bismuth for 10 to 14 days. After three therapeutic failures, further

treatment should be limited to exceptional cases and guided by phenotypic and genotypic tests for antimicrobial susceptibility.<sup>5,37</sup>

## V. CONCLUSIONS

This literature review describes current standards for treating *H. pylori* through a global analysis of research in this area. Various medications—metronidazole, clarithromycin, levofloxacin, amoxicillin, furazolidone, and clavulanate—were analyzed for their effectiveness against *H. pylori*.

Studies show that the VPZ-amoxicillin dual therapy has acceptable eradication rates, improved safety and tolerability, and reduced risk of antimicrobial resistance. Quadruple therapy with VPZ is also safe. Other options, such as bismuth-free quadruple therapies and VPZ-based triple therapy, are effective even in areas with high antimicrobial resistance. Traditional triple treatment with PPIs, amoxicillin, and clarithromycin, while commonly prescribed, is facing challenges due to drug resistance, particularly to clarithromycin. The choice of treatment should consider local antibiotic resistance and individual patient characteristics.

More research into the actions of drugs against *H. pylori* is needed to help reduce future levels of antimicrobial resistance and minimize the significant impact on the gut microbiota.

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**Author Contributions:** For Maykon Jhuly Martins de Paiva (Main Author): He coordinated the literature review, contributing to the identification and critical analysis of relevant studies on *Helicobacter pylori* (*H. pylori*). He developed the overall structure of the article, including methodological aspects and contemporary treatment approaches. He actively participated in writing the manuscript, integrating findings from the reviewed studies and providing a clinical perspective. The other authors: participated in the collection and organization of relevant data, assisting in the analysis of the included studies.

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## REFERENCES RÉFÉRENCES REFERENCIAS

1. Thomsen LL, Gavin JB, Tasman-Jones C. Relation of *Helicobacter pylori* to the human gastric mucosa in chronic gastritis of the antrum. *Gut* 1990; 31(11): 1230-1236. doi:10.1136/gut.31.11.1230

2. Teixeira TF, De Souza IKF, Rocha RDR. *Helicobacter pylori*: infecção, diagnóstico laboratorial e tratamento. *Percursos Acadêmicos* 2017; 6(12): 481. doi: <https://doi.org/10.5752/P.2236-0603.2016v6n12p481>
3. Arévalo A, Otero WA, Trespalacios AA. *Helicobacter pylori*: Multiple resistance in patients from Bogotá, Colombia. *Biomedica* 2019; 39(s1):125-134. doi: 10.7705/biomedica.v39i3.4437
4. Hooi JKY, Lai WY, Ng WK, Suen MMY, Underwood FE, Tanyingoh D, Malfertheiner P, Graham DY, Wong VWS, Wu JCY, Chan FKL, Sung JY, Kaplan GG, Ng SC. Global Prevalence of *Helicobacter pylori* Infection: Systematic Review and Meta-Analysis. *Gastroenterology* 2017; 153(2):420-429. doi: 10.1053/j.gastro.2017.04.022
5. Coelho LGV, Marinho JR, Genta R, Ribeiro LT, Passos MDCF, Zaterka S, Assumpção PP, Barbosa AJA, Barbuti R, Braga LL, Breyer H, Carvalhaes A, Chinzon D, Cury M, Domingues G, Jorge JL, Maguilnik I, Marinho FP, Moraes-Filho JP, Parente JML, Paula-E-Silva CM, Pedrazzoli-Júnior J, Ramos AFP, Seidler H, Spinelli JN, Zir JV. IVth Brazilian consensus conference on *Helicobacter pylori* infection. *Arq Gastroenterol* 2018; 55(2): 97-121. doi: 10.1590/S0004-2803.201800000-20
6. Zhang M. High antibiotic resistance rate: A difficult issue for *Helicobacter pylori* eradication treatment. *World J Gastroenterol* 2015; 21(48):13432-13437. doi: 10.3748/wjg.v21.i48.13432
7. WHO publishes list of bacteria for which new antibiotics are urgently needed - PAHO/WHO | Pan American Health Organization. Available at: <<https://www.paho.org/pt/noticias/27-2-2017-oms-publica-lista-bacterias-para-quais-se-necessitam-no-vos-antibioticos>>.
8. Graham DY. Transitioning of *Helicobacter pylori* Therapy from Trial and Error to Antimicrobial Stewardship. *Antibiotics* 2020; 9(10): 671. doi: 10.3390/antibiotics9100671
9. Huh KY, Chung H, Kim YK, Lee S, Bhatia S, Takanami Y, Nakaya R, Yu KS. Evaluation of safety and pharmacokinetics of bismuth-containing quadruple therapy with either vonoprazan or lansoprazole for *Helicobacter pylori* eradication. *Br J Clin Pharmacol* 2022; 88(1):138-144. doi: 10.1111/bcp.14934
10. Bi H, Chen X, Chen Y, Zhao X, Wang S, Wang J, Lyu T, Han S, Lin T, Li M, Yuan D, Liu J, Shi Y. Efficacy and safety of high-dose esomeprazole-amoxicillin dual therapy for *Helicobacter pylori* rescue treatment: a multicenter, prospective, randomized, controlled trial. *Chin Med J* 2022; 135(14): 1707-1715. doi: 10.1097/CM9.0000000000002289
11. Shih CA, Shie CB, Tai WC, Chuah SK, Lee HC, Hsu PI. Update on the second-line treatment of *Helicobacter pylori* infection: a narrative review. *Therap Adv Gastroenterol*. 2023; 16: 17562848231192750. doi:10.1177/17562848231192750
12. Jones NL, Koletzko S, Goodman K, Bontems P, Cadranet S, Casswall T, Czinn S, Gold BD, Guarner J, Elitsur Y, Homan M, Kalach N, Kori M, Madrazo A, Megraud F, Papadopoulou A, Rowland M; ESPGHAN, NASPGHAN. Joint ESPGHAN/NASPGHAN Guidelines for the Management of *Helicobacter pylori* in Children and Adolescents (Update 2016). *J Pediatr Gastroenterol Nutr* 2017; 64(6): 991-1003. doi: 10.1097/MPG.0000000000001594
13. Lu L, Wang Y, Ye J, Han Y, Lou G, Li Y, Yan H, Du Q. Quadruple therapy with vonoprazan 20 mg daily as a first-line treatment for *Helicobacter pylori* infection: A single-center, open-label, noninferiority, randomized controlled trial. *Helicobacter* 2023; 28(1):e12940. doi:10.1111/hel.12940
14. Koroglu M, Ayvaz MA, Ozturk MA. The efficacy of bismuth quadruple therapy, sequential therapy, and hybrid therapy as a first-line regimen for *Helicobacter pylori* infection compared with standard triple therapy. *Niger J Clin Pract* 2022; 25(9):1535-1541. doi: 10.4103/njcp.njcp\_89\_22
15. Parra-Sepúlveda C, Merino JS, Sáez-Carrillo K, González C, García-Cancino A. Antibiotic resistance surveillance of *Helicobacter pylori* at the biobío region (Chile) in a decade. *Arq Gastroenterol* 2019; 56(4):361-366. doi:10.1590/S0004-2803.201900000-72
16. Chey WD, Mégraud F, Laine L, López LJ, Hunt BJ, Howden CW. Vonoprazan Triple and Dual Therapy for *Helicobacter pylori* Infection in the United States and Europe: Randomized Clinical Trial. *Gastroenterology* 2022; 163(3): 608-619. doi: 10.1053/j.gastro.2022.05.055
17. Hu Y, Xu X, Liu XS, He C, Ouyang YB, Li NS, Xie C, Peng C, Zhu ZH, Xie Y, Shu X, Zhu Y, Graham DY, Lu NH. Fourteen-day vonoprazan and low- or high-dose amoxicillin dual therapy for eradicating *Helicobacter pylori* infection: A prospective, open-labeled, randomized non-inferiority clinical study. *Front Immunol* 2023; 13: 1049908. doi: 10.3389/fimmu.2022.1049908
18. Choi YJ, Lee YC, Kim JM, Kim JI, Moon JS, Lim YJ, Baik GH, Son BK, Lee HL, Kim KO, Kim N, Ko KH, Jung HK, Shim KN, Chun HJ, Kim BW, Lee H, Kim JH, Chung H, Kim SG, Jang JY. Triple Therapy-Based on Tegoprazan, a New Potassium-Competitive Acid Blocker, for First-Line Treatment of *Helicobacter pylori* Infection: A Randomized, Double-Blind, Phase III, Clinical Trial. *Gut Liver* 2022; 16(4):535-546. doi: 10.5009/gnl220055
19. Hsu PI, Tsay FW, Kao JY, Peng NJ, Chen YH, Tang SY, Kuo CH, Kao SS, Wang HM, Wu IT, Shie CB, Chuah SK, Wu DC; Taiwan Acid-related Disease, Microbiota (TARD-M) Consortium. Tetracycline-



- levofloxacin versus amoxicillin-levofloxacin quadruple therapies in the second-line treatment of *Helicobacter pylori* infection. *Helicobacter* 2021; 26(5):e12840. doi: 10.1111/hel.12840
20. Huang X, Wu B, Chen Q, Chen Y, Ji X, Zhou X, Suo B, Lin Z, Zheng X. Antibiotic resistance profile of *Helicobacter pylori* to 14 antibiotics: a multicenter study in Fujian, China. *PeerJ* 2023; 11: e15611. doi: 10.7717/peerj.15611
21. Dang NQH, Ha TMT, Nguyen ST, Le NDK, Nguyen TMT, Nguyen TH, Pham TTH, Tran VH. High rates of clarithromycin and levofloxacin resistance of *Helicobacter pylori* in patients with chronic gastritis in the south east area of Vietnam. *J Glob Antimicrob Resist* 2020; 22: 620-624. doi: 10.1016/j.jgar.2020.06.007
22. Tran TT, Nguyen AT, Quach DT, Pham DT, Cao NM, Nguyen UT, Dang AN, Tran MA, Quach LH, Tran KT, Le NQ, Ung VV, Vo MN, Nguyen DT, Ngo KD, Tran TL, Nguyen VT. Emergence of amoxicillin resistance and identification of novel mutations of the *pbp1A* gene in *Helicobacter pylori* in Vietnam. *BMC Microbiol* 2022; 22(1):41. Published 2022 Feb 3. doi: 10.1186/s12866-022-02463-8
23. Luo L, Ji Y, Yu L, Huang Y, Liang X, Graham DY, Lu H. 14-Day High-Dose Amoxicillin- and Metronidazole-Containing Triple Therapy With or Without Bismuth as First-Line *Helicobacter pylori* Treatment. *Dig Dis Sci* 2020; 65(12): 3639-3646. doi: 10.1007/s10620-020-06115-7
24. Macedo Silva V, Lima Capela T, Freitas M, Boal Carvalho P, Magalhães J, Cotter J. A "new" option in *Helicobacter pylori* eradication: High-dose amoxicillin dual therapy outperforms bismuth quadruple therapy in a high dual resistance setting. *Helicobacter* 2023; 28(3): e12962. doi: 10.1111/hel.12962
25. Seo SI, Lim H, Bang CS, Yang YJ, Baik GH, Lee SP, Jang HJ, Kae SH, Kim J, Kim HY, Shin WG. Bismuth-Based Quadruple Therapy versus Metronidazole-Intensified Triple Therapy as a First-Line Treatment for Clarithromycin-Resistant *Helicobacter pylori* Infection: A Multicenter Randomized Controlled Trial. *Gut Liver* 2022; 16(5): 697-705. doi: 10.5009/gnl210365
26. Ratana-Amornpin S, Sanglutong L, Eiamsitrakoon T, Siramolpiwat S, Graham DY, Mahachai V. Pilot studies of vonoprazan-containing *Helicobacter pylori* eradication therapy suggest Thailand may be more similar to the US than Japan. *Helicobacter* 2023;28(6):e13019. doi: 10.1111/hel.13019
27. Benigno TGDS, Ribeiro Junior HL, Azevedo OGR, Pinheiro RF, Oliveira RTG, Maciel FS, Oliveira EL, Queiroz DMM, Braga LLBC. Clarithromycin-resistant *H. pylori* primary strains and virulence genotypes in the Northeastern region of Brazil. *Rev Inst Med Trop* 2022;64:e47. doi: 10.1590/S1678-9946202264047
28. Wang YZ, Chen J, Pei SQ, Wang C, Han G, Kan LD, Li LC. Treatment strategies and pharmacist-led medication management for *Helicobacter pylori* infection. *Drug Dev Res* 2023; 84(2):326-336. doi: 10.1002/ddr.22025
29. Alba C, Blanco A, Alarcón T. Antibiotic resistance in *Helicobacter pylori*. *Curr Opin Infect Dis* 2017; 30(5): 489-497. doi: 10.1097/QCO.0000000000000396
30. Ahmed A, Balata GF, Elsadek HM, Amin A. Review: Treatment of *Helicobacter pylori* infection. *Zagazig J Pharm Sci* 2020; 29(2):11-23.
31. Suzuki S, Kusano C, Horii T, Ichijima R, Ikehara H. The Ideal *Helicobacter pylori* Treatment for the Present and the Future. *Digestion*. 2022; 103(1): 62-68. doi: 10.1159/000519413. Epub 2021 Oct 18. PMID: 34662879.
32. Ko SW, Kim YJ, Chung WC, Lee SJ. Bismuth supplements as the first-line regimen for *Helicobacter pylori* eradication therapy: Systemic review and meta-analysis. *Helicobacter* 2019; 24(2): e12565. doi: 10.1111/hel.12565
33. Li L, Zhou W, Li H, et al. Antibiotic Resistance of *Helicobacter pylori* Isolated from Patients after Partial Gastrectomy: A Retrospective Study. *Turk J Gastroenterol* 2021; 32(12):996-1002. doi: 10.5152/tjg.2020.19354
34. Megraud F, Coenen S, Versporten A, et al. *Helicobacter pylori* resistance to antibiotics in Europe and its relationship to antibiotic consumption. *Gut* 2013; 62(1):34-42. doi: 10.1136/gutjnl-2012-302254
35. Huang X, Wu B, Chen Q, et al. Antibiotic resistance profile of *Helicobacter pylori* to 14 antibiotics: a multicenter study in Fujian, China. *PeerJ*. 2023; 11: e15611. doi: 10.7717/peerj.15611
36. Ansari S, Yamaoka Y. *Helicobacter pylori* Infection, Its Laboratory Diagnosis, and Antimicrobial Resistance: a Perspective of Clinical Relevance. *Clin Microbiol Rev* 2022; 35(3): e0025821. doi: 10.1128/cmr.00258-21
37. Caetano, J. IV Consenso Brasileiro sobre Infecção pelo *Helicobacter pylori*. Available at: <<https://endoscopiaterapeutica.com.br/artigoscomentados/iv-consenso-brasileiro-sobre-infeccao-pelo-helicobacter-pylori/>>. Accessed at: Dec. 4, 2023.



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## Assessing Remote Social Interaction for Autistic People using Physiological Signals in a Collaborative Virtual Reality Workplace

By Miguel Alejandro Reyes-Consuelo, Dominique Michaud, Jonathan Proulx-Guimond, Geoffreyjen Edwards, Claude Vincent, Ernesto Morales, Audrey Raynault, Julie Ruel, Sylvain Letscher, Valéry Psyché, James Hutson, Piper Hutson & Jocelyne Kiss

*Laval University*

**Abstract-** The study focuses on enhancing workplace experiences for autistic people by addressing professional burnout risks. Acknowledging the benefits of sensory adjustments for autistic employees, previous interactions with autistic participants associations and inclusive organizations highlighted challenges in gauging emotional well-being during workplace social dynamics and tasks. This study delves into real-time evaluations centered on collaborative task-based social interactions. The methodological design consists of a Collaborative Virtual Simulation (CVS) specifically crafted for vocational training targeting autistic people. We have implemented a feedback system for real-time monitoring of cognitive stress, mental workload, and emotional self-regulation within the CVS. The assessment of our approach involved analyzing cognitive stress, mental workload, and physiological synchronization of respiratory sinus arrhythmia (RSA), amidst neuroatypical and neurotypical pairs within the CVS.

**Additional Keywords and Phrases:** autism, workplace integration, professional burnout, emotional well-being, collaborative virtual simulation (CVS).

**GJHSS-H Classification:** FOR Code: 170101



ASSESSING REMOTE SOCIAL INTERACTION FOR AUTISTIC PEOPLE USING PHYSIOLOGICAL SIGNALS IN A COLLABORATIVE VIRTUAL REALITY WORKPLACE

*Strictly as per the compliance and regulations of:*



RESEARCH | DIVERSITY | ETHICS

# Assessing Remote Social Interaction for Autistic People using Physiological Signals in a Collaborative Virtual Reality Workplace

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**Additional Keywords and Phrases:** autism, workplace integration, professional burnout, emotional well-being, collaborative virtual simulation (CVS).

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## I. INTRODUCTION

Autism, a complex neurodevelopmental condition, presents with communication challenges, difficulties in social interaction, and repetitive behaviors [31]. Autistic people often perceive social cues differently, leading to hurdles in initiating conversations [90], and cultivating lasting social relationships [9]. Such challenges can reduce their inclination towards active social engagement. For some, this translates into a preference for solitary activities and an aversion to social scenarios, complicating social participation [12]. Nevertheless, not every autistic person exhibits these tendencies; some eagerly pursue social engagements [14].

To enhance the social engagement of autistic people, tailored interventions prove essential [46]. These strategies encompass social skills coaching, peer support mechanisms, and customized inclusive settings [60]. Addressing autism's unique challenges can elevate social involvement, thereby enhancing their quality of life [24].

Given the rising global prevalence of autism, discerning its underlying intricacies and pinpointing effective interventions hold immense research value [45]. Employment, vital for fostering independence and social inclusion, improves life quality for those living with autism [40]. Skill development boosts workplace competence and success for these individuals [23]. Yet, a staggering 85% of degree-holding autistic individuals remain unemployed [7]. Such unemployment not only curtails financial autonomy and growth prospects but can also engender feelings of isolation, diminishing overall well-being [27, 48].

### a) Autism in the workplace

The transition to workplace environments often precipitates burnout in individuals with autism [50]. During a focus group, inclusive employers elucidated the complexities associated with assimilating autistic employees into the workforce, underscoring the necessity for swift contextual understanding as conventional emotional communication methods often prove inadequate [25]. A salient consideration is the exertion to align with neurotypical standards in

workplaces, which can precipitate substantial fatigue in autistic employees [82]. This alignment, termed "masking" or "camouflaging," entails curtailing innate autistic traits to resonate with neurotypical peers [35]. Such continuous adaptation can be mentally taxing, compelling the individual to suppress sensory sensitivities or navigate complex social contexts, elevating stress levels and escalating the potential for burnout [44].

The presence of alexithymia further complicates workplace dynamics for the autistic, impairing effective social interaction navigation [73]. Predominantly observed within the autistic demographic, alexithymia is marked by challenges in discerning and articulating emotions, with a pronounced emphasis on factual details over emotional experiences [36]. Such emotional navigation barriers can foster misinterpretations, hampering the formation of constructive work relationships, and subsequently affecting job efficacy and overall well-being [43].

Anticipated miscomprehension or discrimination due to autism exacerbates the emotional strain of workplace adaptation [39]. Masking, sensory overload management, and unaided social challenge navigation cumulatively amplify resignation likelihoods [62]. The current research spotlights burnout detection via tangible physiological indicators while acknowledging burnout's multifaceted nature, including its psychological facet [50]. The hypothesis posits that tangible markers—cognitive stress, mental workload, and emotional self-regulation, anchored in respiratory sinus arrhythmia—exert pronounced effects on emotional well-being in delineated scenarios. Accurate measurements necessitate individualized calibrations, defying universal benchmarks.

Studies on social cognition underscore the burgeoning demand for social skill instruction among autistic individuals, yielding affirmative outcomes in improving interpersonal capacities [30]. Notwithstanding, adept job readiness doesn't immunize against unanticipated social impediments, which can culminate in distressing encounters and subsequent fatigue [6]. Such challenges frequently remain undetected, unarticulated, or unaddressed until they intensify, prompting some to vacate their positions [69]. While inclusive employers acknowledge the merits of bespoke support for autistic employees, they pinpoint a prevailing predicament: extant assistive tools for social exchanges often adopt a generic stance, operating more reactively than proactively, thereby attenuating their potential to cater comprehensively to the autistic workforce's distinct requirements.

#### *b) Related research works*

Literature encompassing the application of virtual reality (VR) technology for the autistic population predominantly pivots around two cardinal domains. The

initial domain pertains to the cultivation and instruction of social skills [20], while the subsequent realm delves into the discernment, interpretation, and emotional receptivity of autistic individuals [55]. Albeit the anterior research promises encouraging outcomes, certain constraints associated with deploying VR interventions for these stipulated objectives have been documented [11, 20, 47].

Substantial empirical evidence underscores the efficacy of VR in augmenting self-assurance during job interviews [77], attenuating aversive attitudes during driving [70], enriching transportation literacy [76], bolstering navigational aptitudes [72], and diminishing errors associated with road sign interpretation [71]. Notwithstanding these affirmative outcomes manifested by preceding research [49], the research calls for an augmented deployment of VR/AR in interventions targeting autism-related social skills. Such a call accentuates the imperative for novel research, the exploration of head-mounted displays (HMDs) in light of technological advancements and cross-disciplinary collaboration, and the paramount importance of redressing gender disparities in research participation [20].

A review of insights from 23 empirical studies focusing on VR-anchored behavioral interventions for autistic individuals discerned that a preponderant segment targeted vocational competencies [13]. Yet, an overarching emphasis seemed to be placed on the selection trajectory with limited elucidations on how such interventions could buttress sustained employment post-interview. Such insights fortify the potential of VR in instructing driving, enhancing interview competencies, bolstering safety, and advocating training generalization. The bespoke features of VR interventions, coupled with additional practice and the propitiousness for skill generalization, might find resonance in an array of vocational frameworks.

However, instances of immersive environments curated to support autistic individuals beyond the interview phase appear to be scant. The pioneering work of Bozgeyikli, et al. [10] showcased VR4VR, a virtual reality apparatus conceptualized for vocational rehabilitation of those diagnosed with Autism Spectrum Disorder (ASD). Their findings elucidated the insights gathered from testing sessions, wherein participants honed transferable occupational skills such as cleaning and money management. Likewise, Sher, et al.'s [75], research exploited VR to bolster culinary competencies among autistic high school attendees. In a parallel vein, Amat, et al. [4], proffered VIRCAS, a collaborative VR interface fashioned for both autistic and neurotypical adults to augment team coordination. Such innovative endeavors corroborate the reception and potential of virtual realms in refining occupational social skills for autistic individuals. Yet, these explorations seldom broach the pivotal challenge of articulating



discomfort within cooperative milieus, prior to its manifestation.

A nuanced examination of 185 articles focusing on autism-specific technologies delineated six cardinal categories, encompassing behavior analysis and well-being [57]. A recurrent lacuna, however, lies in these technologies' propensity to superimpose neurotypical standards, thereby depriving autistic individuals of self-determination. A pressing exigency thus emerges for technologies advocating autonomous involvement that mirrors the principles of neurodiversity.

To meet such a demand, VR learning realms tailored for autism could accentuate interactional perceptions [2]. Through integrative designs amalgamated with autism-centric learning paradigms, these milieus could optimize cognitive engagement and bolster efficacy [88]. The confluence of such interactive methodologies within VR platforms enables the replication of real-world social situations, fostering regulated practice and instilling confidence.

Moreover, a surging call for bespoke learning experiences heralds the merger of avant-garde technologies [3]. Personalized, experiential, and immersive learning opportunities are crucial to closing gaps in traditional methods. These technologies offer customized pathways, enhancing engagement and knowledge retention by adapting to diverse learning styles.

Customizable, immersive, and experiential learning avenues become indispensable to address the lacunae inherent in conventional methodologies [51]. Through adaptive pedagogical trajectories, immersive platforms become more alluring, championing proactive engagement, exploration, and a profound assimilation of academic content [67]. Additionally, the imperative of eschewing profit-driven imperatives in curricular design has been underscored [34], placing developmental imperatives at the zenith to cultivate genuinely inclusive learning realms.

Building upon this extensive research corpus, the current exploration ventures into discerning how VR could serve as a conduit to facilitate understanding between autistic individuals and their support network, particularly concerning emotional wellness in occupational settings, thereby engendering affirmative vocational experiences for autistic individuals.

#### c) *Research question*

Central to the anticipations of autistic individuals and inclusive employers is the elucidation of determinants during interactions that potentially precipitate discomfort. Consequently, the primary inquiry of the current study posits: How pertinent is it for users to garner real-time feedback concerning physiological indices indicative of cognitive stress and emotional regulation?

#### d) *Objectives*

Through achieving the following objectives, this research aspires to significantly contribute to the creation of more inclusive and supportive work environments for autistic people:

- *Design and implementation (Objective 1):* Develop a real-time, self-calibrating VR simulation system for social interactions, aimed at fostering a deeper understanding of social dynamics for autistic people in professional settings.
- *Self-Awareness and synchrony (Objective 2):* Enhance self-awareness among autistic employees by providing indicators of physiological well-being, and establish synchrony between neuroatypical and neurotypical individuals during simulated social interactions.
- *Quality of interaction and well-being (Objective 3):* Identify and interpret indices that can shed light on the quality of social interactions and the overall well-being of autistic employees in the workplace, using data gathered from the VR simulation.
- *Usability assessment (Objective 4):* Evaluate the effectiveness, relevance, and user-friendliness of the VR simulation system from the perspective of autistic individuals, aiming to identify areas for improvement.
- *Analysis of system limitations (Objective 5):* Discuss and analyze the potential limitations and challenges associated with the implementation of VR-based adaptation systems in real-world professional settings, guiding future research and development in this area.

#### e) *Outline of the article*

The ensuing sections of the article adhere to the following structure: The initial segment delves into the methodologies applied in the design, construction, and experimentation of the system. Subsequent to that, the findings derived from the experimentation involving five autistic participants will be detailed, with a focus on RSA, physiological synchrony, cerebral activity, and their subjective evaluation of interactions, all within the purview of the CVS. Concluding the article, an emphasis will be placed on the paramountcy of the study's direction in tackling the challenges of integration and retention experienced by autistic individuals within professional environments. Concurrently, a discourse on the study's present constraints will be provided, coupled with an overview of anticipated future endeavors.

## II. METHODS

Our methodology is based in mixed approaches, aiming to design and construct an adaptive system for measuring physiological well-being indicators, simulating workplace social interactions for





collaboration in the workplace purposes, and assessing the usability and relevance of our system within a demographic of autistic individuals.

The adopted methodology hinges upon a confluence of mixed-method approaches, with the primary objective of designing and constructing a responsive system. This system is poised to gauge indicators pertinent to physiological well-being, emulate workplace social dynamics for collaborative engagements, and evaluate the system's usability and pertinence amongst a cohort of autistic individuals. In the subsequent segments, an articulation of the formulated hypotheses and distinct contributions will be presented. Following that, an in-depth exploration of the collaborative workplace simulation will ensue. Concluding this section, an elaboration on the instruments and measurement apparatuses utilized for the assessment of the CVS will be provided, accompanied by a comprehensive delineation of the study's experimental procedure.

#### a) *Hypothesis and contributions*

The current work is a study on the utilization of a CVS aimed at enhancing the employability of individuals with autism in the workplace, employing real-time monitoring of various physiological indicators. This exploratory study explored different physiological markers that could indicate the manifestation of quality social interaction between the autistic-companion dyad when using this collaborative VR platform. We wanted to provide a proof of principle based on (1) physiological synchrony by assessing the time series of parasympathetic activity, adapting a modern statistical methodology proposed in the literature to determine the degree of physiological synchrony in the RSA responses of the participants during these sessions, as well as on (2) the physiological responses of the autistic participants from brain activity during these sessions. We present the following hypotheses:

*H1:* Will the respiratory sinus arrhythmia (RSA) synchrony between the autistic participant and their companion surpass that of the surrogate controls, thereby indicating the presence of physiological synchrony at a distance during the use of the collaborative platform?

*H2:* Will there be a progressive improvement in brain activity markers, suggesting that the mode of collaboration facilitated by the system is effective in enhancing the comfort of the autistic participant?

This work offers the following contributions:

- First, we propose and evaluate a conceptual VR system called Virtual Companion (VC) that is designed to address the social and emotional challenges of individuals with autism in the workplace. This fills a gap in the existing literature because most of the technology research on autism

involving physiology-based measures focuses on children and adolescents.<sup>4</sup>

- Second, our research adds to the body of research in the underexplored area of autism technology by taking a social perspective rather than a medical approach. We identify a lack of VR systems that emphasize training for social interaction and provide emotional well-being in the workplace. Accordingly, we propose a VR environment that not only prioritizes promoting social interactions and aims to improve the adaptability of autistic individuals to their work environment, but also enables self-awareness of physiological reactions during workplace interactions in order to ensure emotional well-being in the workplace.
- Finally, our present study is so far one of the few that have addressed physiological signals in VR sessions and, to our knowledge, the first study to explore the synchronicities of autonomic nervous system regulation markers (respiratory sinus arrhythmia) using a validated surrogate test window cross-correlation (SUSY) approach, between the neurotypical-neuroatypical pair, in a remote context simulating the workplace.

#### b) *Collaborative workplace simulation designed for social interaction training*

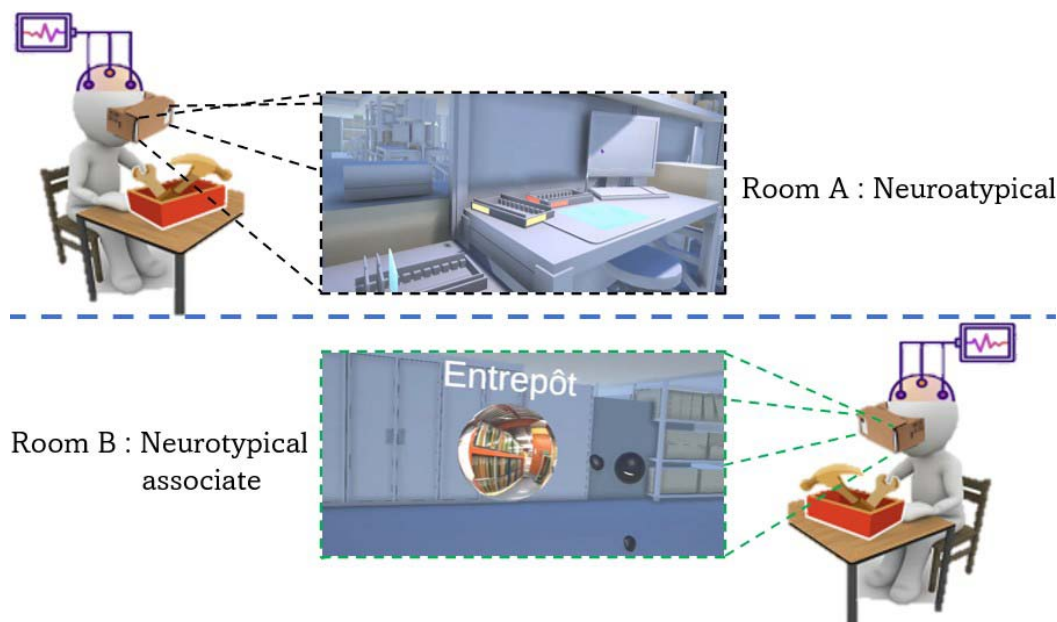
The development of social competencies in individuals with autism stands out as a pivotal initiative in fortifying their employability prospects [34]. Methodologies to develop the social skills of autistic people for corporate training are usually based on behavioral imitation of movements and speech [42], which are merged with well-described tasks in the workplace associated with goals to be achieved [56]. Getting them to carry out more collaborative activities therefore requires positive social interdependence as defined by Johnson and Johnson [33], where the achievement of each team member's personal goals is affected by the actions of others. Negative social interdependence, on the other hand, is mobilised when individuals perceive that their peers must fail if they are to achieve theirs.

VR interventions have shown promise in helping autistic people in various contexts, including the workplace [11]. VR provides great technological support for promoting workplace adaptation, as it could simulate a work environment and provide a non-judgmental place to prepare for real-world social expectations [38]. Autistic people benefit significantly from VR interventions as they allow them to better understand social dynamics and respond to them with the expected attitude [41].

Expanding upon this body of research, we explored how virtual reality could aim to ensure emotional well-being and foster positive work

experiences for the neurotypical. The Virtual Companion (VC) research project, which contextualizes this study, is based on this principle of virtual simulation of a work environment based on an ergonomic study of the space, an analysis of the tasks and work habits of employees in an inclusive company [25]. The VC project stems from the

inclusive companies' call that while the development of social skills enabled people with autism to get a job, their job retention would be determined by their ability to maintain their mental health at work [92]. Burnout seems to be one of the main causes that lead autistic people to leave their job or to reduce their workload considerably [5].



**Fig. 1:** Representative diagram of the configuration of the virtual companionship system. The neurotypical is in a different room from his neurotypical counterpart. Both wear a virtual reality headset connected to the internet, which they use to communicate in real-time (via the integrated microphone and headset) and to move and interact in the virtual environment. Both can see each other through an avatar within the virtual environment. Additionally, both wear physiological sensors that store time series of parasympathetic and brain activity.

The VC simulation is based on the application of TRIZ theory, a problem-solving algorithm that seeks to refine the use of VR systems to improve adaptability and efficiency. The application, described extensively in prior work by Proulx-Guimond 2023 [25], aims primarily to improve employers' understanding of issues related to autistic employees and to identify the most critical challenges they face in the workplace. Through literature reviews, surveys and focus groups, the VC project investigates the factors affecting autistic people in the workplace. It identifies the key components for developing a more effective VR system to support workplace integration based on the following aims.

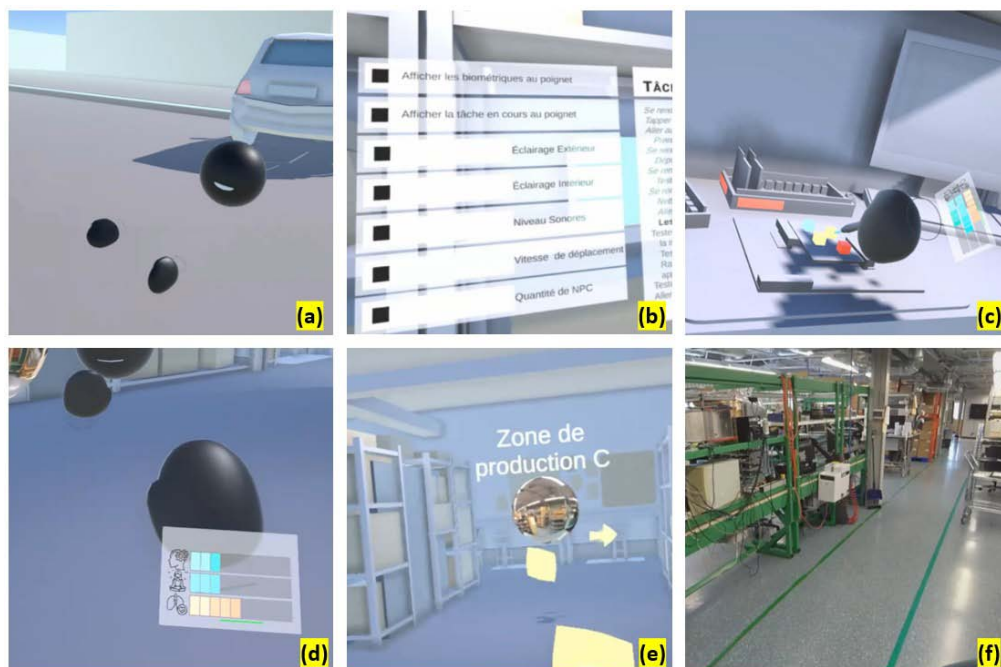
The VC system is experienced remotely and allows the collection and display of biometrics in real-time. Figure 1 illustrates the setup of a VC session, where the autistic and a neurotypical associate, in separate rooms, use internet-connected VR headsets for real-time communication and interaction.

Seeking to provide a safe and controlled environment to support the autistic in their workplace adaptation, we have integrated the following components that constitute the VC system. Firstly, the virtual reality simulation aims to develop social

communication, problem-solving and interpersonal skills, where a human associate (which we have called "companion") provides real-time information and guidance within the virtual environment (Figure 2a). Often, people with autism present sensory sensitivities that can be challenging in traditional work environments [81]. To this end, the VC application allows for the creation of customizable and controlled sensory experiences that allow people to gradually adapt to different stimuli sources, thereby helping the autistic to reduce sensory overload in the workplace. We have integrated a modulator panel into the VR environment to adjust the levels of different stimulus sources, such as the sound level, the light level inside and outside the virtual working environment, the scrolling speed and the number of non-playable characters (NPCs) around the scene (Figure 2b). Within the simulation, we simulate work tasks to help people with autism learn and practice work-related skills in a realistic and immersive virtual environment (Figure 2c). Job task replication can be particularly beneficial for people with autism to perform tasks that require spatial awareness, attention to detail or complex procedures, as it provides a controlled

environment to learn and practice work-related skills while reducing real-world stressors. Furthermore, stress and anxiety in the workplace can be significant challenges for people with autism. To this end, we have integrated a panel of physiological measures that reflect in real-time different metrics related to parasympathetic activity (respiratory sinus arrhythmia) and brain activity (level of attention and relaxation) in order to promote self-awareness about the autistic's physiology and help them manage stress and anxiety

levels (Figure 2d). Additionally, some people with autism may have difficulties adapting to new environments or changes in the workplace. So, the application can familiarize individuals with the work environment before they enter it. By integrating interactive capsules of 360-degree panoramic photographs of real locations, we aim to help reduce anxiety by providing a sense of predictability and control (Figure 2e and Figure 2f).



**Fig. 2:** The virtual companionship (VC) platform, designed for neurodiverse individuals, simulates a work environment to enhance social skills and workplace adaptation. It's accessed through a VR headset connected to the internet, providing a synchronous, remote experience. Features include: a) Avatar's view: users, represented as 'black blobs,' interact in the VR workspace using voice and movement, enabled by integrated headset microphones, speakers, and controllers. b) Modulatory panel: This panel in the VR setup allows users to adjust various stimuli levels, such as sound and light intensity inside and outside the virtual workspace, movement speed, and the presence of non-playable characters (NPCs). c) Welding task simulation: The platform includes tasks like a simplified manual welding test, helping users familiarize with specific workstations without needing extensive technical skills. d) Physiological signal panel: Located on the virtual avatar's wrist, this panel displays indicators of the user's physiological state, including respiratory sinus arrhythmia and brain activity metrics (Meditation and Attention), gathered from sensors on the user's arm and head. e) Interactive panoramic spheres (outside view): Distributed throughout the VR environment, these spheres offer 360-degree views of real company sites, aiding in familiarization before actual visits. f) Interactive panoramic spheres (inside view): This feature provides an internal perspective of the panoramic spheres. For comprehensive details on this simulation and its components, consult prior work by Proulx-Guimond et al. 2023 [25]; This platform represents a groundbreaking approach in using VR technology to assist autistic individuals in integrating into professional environments, emphasizing the potential of interactive and adaptive virtual tools in occupational therapy and support.

### c) Respiratory sinus arrhythmia

With these clues in mind, we explored the corpus of polyvagal theory, which includes adaptive behavioural strategies of nervous systems, describing at the physiological level how social engagement might occur [65]. Hofheimer [32] presents *respiratory sinus arrhythmia* (RSA) as a physiological measure that could give some clues about the quality of interaction during a social exchange, even for non-verbal individuals, such as newborns.

RSA is described as a natural variation of heart rate during the respiratory cycle. It is characterized by a rhythmic fluctuation of the heart rate, which increases during inhalation and decreases during exhalation. During inhalation, the sympathetic nervous system is activated, resulting in a slight increase in heart rate. Conversely, during exhalation, the parasympathetic nervous system predominates, leading to a decrease in heart rate. Therefore, this phenomenon is therefore

influenced by the interaction between the respiratory and cardiovascular systems.

RSA is considered a normal physiological response and is observed in healthy individuals. It is most pronounced during relaxed breathing and can be affected by age, physical and emotional state [65]. RSA has been extensively studied and is often used as an indicator of autonomic nervous system function. It can be measured and analyzed by electrocardiography (ECG) and heart rate variability (HRV) analysis [15].

RSA is influenced by specific contexts because it is mediated by changes in emotional states, breathing patterns, physical activity, levels of attention, and other factors that affect the regulation of heart rate by the autonomic nervous system. RSA also measures a person's cardiac vagal tone by reflecting the activity of the parasympathetic nervous system, where higher RSA implies better vagal tone and autonomic flexibility. Furthermore, RSA assesses the quality of interaction [91], as it responds to emotional states during social engagement, providing information about a person's physiological reaction to various social contexts and emotional regulation capabilities [18].

In addition to the relationship between RSA and autonomic nervous system regulation, RSA is an indicator of social cognition that refers to the mental processes involved in perceiving, interpreting, and responding to social information [58]. It plays a crucial role in understanding social cues, empathy with others, and successful social interactions [89].

Our interest in utilizing RSA is additionally rooted in its application for comprehending the unique aspects of emotion regulation in autism [26]. Some studies have found that RSA plays an important role in social engagement and social approach behaviours in people with autism [61]. When an autistic is socially engaged, such as during positive social interactions, the parasympathetic nervous system tends to dominate, leading to an increase in RSA. This increase in RSA reflects the body's adaptive response to facilitate communication and emotional regulation, promoting social cohesion and empathy [89]. On the other hand, lower RSA has been associated with social withdrawal and social anxiety [64]. Social cognition involves motivation and willingness to relate to others, and RSA is related to this aspect of social functioning [66]. In addition, RSA may be related to the ability to respond accurately to social cues and non-verbal communication [63]. Thus, RSA serves as a physiological marker of the body's ability to respond and adapt to social cues and interactions.

#### d) *Physiological synchrony*

Physiological synchrony is part of the social cognition corpus and refers to the phenomenon where the physiological signals of two or more individuals become synchronized or aligned during

social interactions or shared experiences [52, 53, 80]. It reflects the coordination and mirroring of physiological processes between individuals [28]. Physiological synchrony can occur in various interpersonal contexts, such as romantic partners [17], parent-child interactions [19], therapeutic relationships [8], or group activities [22]. When individuals are emotionally attuned or engaged with each other, their physiological systems can become synchronized, reflecting a physiological connectedness [54].

Several physiological measures can be studied to examine physiological synchrony, including heart rate, respiration, electrodermal activity (EDA), blood pressure, and hormonal responses [78], and recently, RSA synchrony between a romantic adult partners [29] and parents and their autistic children [87], to investigate the autonomic nervous system activity and the body's physiological responses to social and emotional cues.

It's important to note that physiological synchrony does not imply causation and, while it can be a positive aspect of interpersonal interactions, the absence of synchrony does not necessarily indicate a lack of connection or understanding. Researchers use various techniques to study physiological synchrony, including measures of coherence, cross-correlation, or time-series analysis of physiological data [52]. These methods allow for the examination of the temporal relationship and alignment of physiological signals between individuals.

#### e) *Experimentation*

This study was approved by the Research Ethics Committee of the Centre Universitaire Intégré de Santé et des Services Sociaux de la Capitale-Nationale (file 2022-2429- RIS\\_) and all participants signed a written informed consent form. Participants must have declared a diagnosis of autism and an interest in VR technologies for workplace adaptation in order to participate. A monetary compensation was offered for their participation in this study, which consisted of 3 VR sessions using the VC system. Prior to any experimental procedure, all participants were screened through email exchanges to confirm inclusion criteria and were instructed to abstain from alcohol, nicotine, and caffeine for at least 4 hours prior to data collection. Upon arrival, participants were given general information about the session procedures, the equipment used both to experience virtual reality and to collect physiological data, and the activities to be performed once inside the virtual environment. They were then asked to sit down to be fitted with the VR headset and sensors, participant and companion in a separate room each wearing a head-mounted display (HMD) and seeing each other through avatars within the VR scene to interact with each other via the controllers, and the integrated microphone and headset.



#### f) Virtual companion sessions

The data collected here are from fifteen virtual companion sessions led by a companion who, by means of an avatar in a virtual environment, introduced the virtual platform and guided the participants through the activities in the simulation. The study was held during the first 3 months of 2023; during this period, a total of 15 virtual companion sessions were provided to five autistic participants, each lasting up to 40 minutes and normally at weekly intervals. All sessions were physiologically monitored; they had a mean duration of 25 min (SD = 8.6; range 8-45 min).

#### g) Monitoring devices

All participants and the companion wore the Emotibit© and Mindwave© Mobile 2 (Neurosky©) ambulatory measurement devices during all VC sessions while using the HMD. To measure parasympathetic activity, we used the Emotibit© sensor, a portable, lightweight, non-invasive, and wireless sensor, which can collect more than 16 biometric signals. Its 3-wavelength Photoplethysmogram (PPG) sensor enabled us to detect volumetric variations in blood circulation. The heart rate data extracted from the PPG was collected at a frequency of one sample every 100 ms, and it was transmitted via WiFi to a computer. To measure electrical brain activity, we used the Mindwave© Mobile 2 headset, a portable, lightweight, non-invasive, and wireless EEG system, which can safely collect EEG power spectra (alpha waves, beta waves, etc.), NeuroSky eSense© meters (Attention and Meditation) and eye blinks (not reported nor analyzed in this study). The device consists of a headset, an ear clip and a sensor arm. The reference and ground electrodes of the earphones are in the ear clip and the EEG electrode is in the sensor arm, resting on the forehead above the eye corresponding to the FP1 position of the 10/20 system. Both sensors were wirelessly connected via WiFi (Emotibit©) and Bluetooth (Mindwave© Mobile 2) to an external computer, allowing for unobstructed movement. The two recording devices were aligned by their internal clocks; in addition, manual markers were used by means of a script to mark the start and end of a session. The recording was manually started and stopped by a laboratory assistant.

#### h) Metrics Computation

- i. *Respiratory sinus arrhythmia (RSA)*. We used the method described in Porges and Bohrer [66], extended by Abney [1] to estimate the RSA value using a time-based approach. This method for estimating the RSA consists of three main steps:
  - (1) The recorded PPG signal is visually inspected to remove motion artefacts.
  - (2) Inter-beat intervals (systolic peaks) are then estimated, and a band-pass filter is applied to the

entire time series to isolate the variance in the frequency range of spontaneous respiration.

- (3) or each time window defined as 120 seconds (5 second step) the RSA value is obtained from the filtered time series by calculating the natural logarithm of the high frequency components of the heart rate variability (0.15 to 0.4 Hz) [21].

It's worth noting that RSA is often employed with a fixed standard value applicable to everyone since it is a physiological phenomenon reflecting variations in heart rate associated with breathing, yet individual baseline RSA values can vary widely. What's considered low or high RSA depends on an individual's baseline, a methodology we have employed in this paper. Therefore, throughout the rest of this article, an RSA value that may be considered low or high for one person would be evaluated based on that individual's own baseline or specific reference values established within this research context, rather than against a universal standard or scale.

- ii. *eSense™ metrics*. The EEG headset used in this study provides two eSense™ metrics: Attention and Meditation. The Attention metric indicates the intensity of the user's level of mental "concentration" or "focus", such as that which occurs during intense concentration and directed (but stable) mental activity. According to the manufacturer, distractions, wandering thoughts, lack of concentration or anxiety can reduce the levels of this metric. The Meditation metric indicates the user's level of mental "calmness" or "relaxation" and is based on a person's mental levels. Meditation is related to reducing the activity of active mental processes in the brain, and the effect of closing the eyes has been observed to shut down the mental activities that process the images in the eyes, so closing the eyes is often an effective method of increasing the level of the Meditation meter. According to the manufacturer, distractions, wandering thoughts, anxiety, agitation and sensory stimuli can lower Meditation meter levels. For the two eSense™ metrics mentioned, the value of the meter is indicated on a relative scale from 1 to 100.
- iii. *Physiological synchrony computation*. In general, synchrony means that two processes are, or correlate at a level that exceeds casual correspondences [59], in this study, we explored the dyadic behavioral time series of the respiratory sinus arrhythmia of the autistic participant and his companion. Algorithms exist for estimating synchrony between two individuals from reading their physiological signals, which address the coupling between two emotional and behavioural processes, mostly operating in the

time domain, using cross-correlations of the paired time series [37, 59, 73].

Here we have employed the surrogate synchrony method (SUSY, cf. [www.embodiment.ch](http://www.embodiment.ch)), used in the study of non-verbal synchrony in psychotherapy based on the relationship of coordinated body movement and therapeutic success outcome [68], in an experiment on dyadic social interaction on non-verbal synchrony and affect [85] and in the study of physiological synchrony of heart rate and heart rate variability during psychotherapy sessions [84].

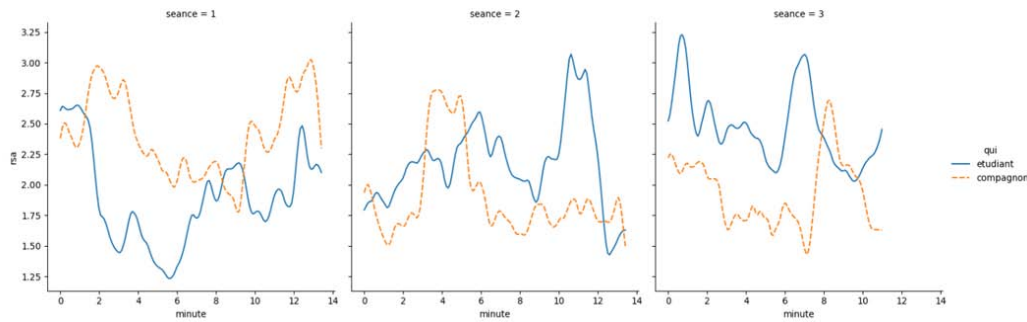
SUSY (cf. [www.embodiment.ch](http://www.embodiment.ch), accessed in July 2023) is based on the cross-correlation function of the time series estimating dyadic synchrony defined as cross-correlations between two time series A and B. The core procedure lies in the control of real synchrony by surrogate synchrony. To test for this, time series A and B are firstly cut into segments according to a "segment size" parameter. Then, SUSY computes cross-correlations within each segment across a certain range of lags. For example, for a "maximum lag" parameter =  $\pm 3$ , all cross-correlations within a six-unit window (i.e. seconds or minutes) are considered. Twofold aggregation of these cross-correlations (across all segments and lags) yields a measure for real synchrony. Beforehand, cross-correlations are Fisher's Z-transformed to allow for aggregation. SUSY consequently provides two indices based on absolute and non-absolute Z values:  $Z_{\text{noabs}}$  and  $Z_{\text{abs}}$ . Whereas  $Z_{\text{abs}}$  indicates overall synchrony,  $Z_{\text{noabs}}$  distinguishes between in-phase and anti-phase synchrony. The complete procedure of dyadicSUSY generates a surrogate control condition for  $Z_{\text{noabs}}$  and  $Z_{\text{abs}}$  by shuffling the sequence of

segments of the original time series, so that segments of A are "falsely" aligned with segments of B. Shuffling can be repeated and produces many different surrogates. Then  $Z_{\text{noabs-surr}}$  and  $Z_{\text{abs-surr}}$  as markers of surrogate synchrony are computed. Mathematical details of SUSY methodology were described by Tschacher and Meier in [84] and Tschacher and Haken in [83].

To explore the first goal of the present article, dyadic SUSY were applied to the RSA time series. We computed synchronies of all dyadic combinations of the fifteen time series pairs of each session. With regard to parameter settings, a segment size of 3 minutes was chosen for this dyadic. We set the number of surrogates to the maximum. The lag parameter in dyadic SUSY was fixed at  $\pm 1$  minute across time series. To obtain global synchrony measures, absolute and non-absolute effect sizes were aggregated across all 15 dyads for both approaches yielding  $ES_{\text{abs}}$  and  $ES_{\text{noabs}}$ . The general formula for effect sizes is  $ES = \frac{\text{mean}(Z) - \text{mean}(Z_{\text{surr}})}{SD(Z_{\text{surr}})}$ , also described in [84] and in [83]. Then, we performed one-sample t-tests against the null hypothesis that the respective aggregated effect sizes,  $ES_{\text{noabs}}$ , were not different from zero. Paired t-tests of  $ES_{\text{abs}}$  and  $ES_{\text{abs-surr}}$  were conducted to test whether synchrony was present based on absolute values. In the case of negative absolute effect sizes, additional paired t-tests were considered redundant (thus, not performed) because surrogate synchrony exceeded real synchrony if  $ES_{\text{abs}} < 0$ . Statistical analyses and plots were performed using the software environment R [79] and python scripts [86].

**Table 1:** Table of descriptive statistics of the RSA values calculated per session and per participant. The values are presented unitless since a natural logarithm is performed on the high frequency components of the HRV or  $\ln(\text{ms}^2)$ , as described in the methodology section. Pxx represents the participant in a anonymized code, and Sxx represents the VC session.

	P01-S01	P01-S02	P01-S03	P02-S01	P02-S02	P02-S03	P03-S01	P03-S02	P03-S03	P04-S01	P04-S02	P04-S03	P05-S01	P05-S02	P05-S03
Mean	1.91	2.08	2.16	1.89	2.18	2.47	1.68	1.90	1.84	1.78	1.93	2.08	1.81	1.59	1.37
S.D.	0.22	0.31	0.44	0.39	0.35	0.31	0.32	0.25	0.37	0.20	0.18	0.41	0.28	0.21	0.39
Min	1.43	1.68	1.52	1.23	1.43	2.03	1.11	1.51	1.03	1.29	1.60	1.54	1.32	1.22	0.85
Max	2.45	2.98	3.09	2.65	3.07	3.23	2.59	2.51	2.87	2.47	2.35	2.95	2.33	1.94	2.10



**Fig. 3:** Curves of calculated RSA values of a participant and his companion during 3 sessions of virtual companionship. The PPG signal is processed by applying a sliding window to obtain the systolic peaks in each period and applying a band-pass filter to isolate the variation in the frequency range of spontaneous breathing. The natural logarithm of the high-frequency component of the heart rate variability is then calculated from the signal obtained in the previous step, resulting in a (RSA) time series sampled at a rate of 10 samples per minute (the solid line represents the participant's RSA, the dotted line represents the companion's RSA).

#### i) Questionnaire to assess remote social interaction

At the end of the last of 3 sessions with a participant, a questionnaire was provided by which the participant evaluated the quality of the exchanges and interactions when using the virtual companionship system using seven-point Likert scales. This post-use questionnaire was developed by the research group through a focus group [16]. This participant report consists of 17 items, was administered in French and can be consulted upon request.

### III. RESULTS

This section is structured as follows: first, we present the results of individual RSA calculations, specifically for each user. Next, we report on the results of physiological synchronization obtained from applying SUSY between the RSA of the neurotypical-neuroatypical pair. Following that, we present the individual physiological responses derived from eSenseTM metrics (Attention and Meditation), culminating with the outcomes of the questionnaire designed to assess the perceived quality of remote interactions.

#### a) Individual RSA and RSA synchrony

RSA time series were calculated for each session at a frequency of ten samples per minute, for the participant and for the companion, using the methodology described in the previous section. The shorter time series pair contained 88 total samples in their time series while the longer one contained 254 samples (equivalent to 9 and 25 minutes in duration respectively). The descriptive statistics of the RSA values calculated per session and per participant are shown in Table 1. The purpose of measuring RSA over three consecutive sessions has allowed us to gather information on an individual's physiological responses over time. This establishes a baseline, identifies trends, and evaluates response consistency. It is important to emphasize that while this approach does not create a traditional self-referential scale, it provides a

personalized understanding of an individual's physiological dynamics, which is valuable for research and interventions aimed at enhancing well-being and stress management. An example of RSA curves across time for a single participant-companion dyad for their three collaborative sessions are shown in Figure 2.

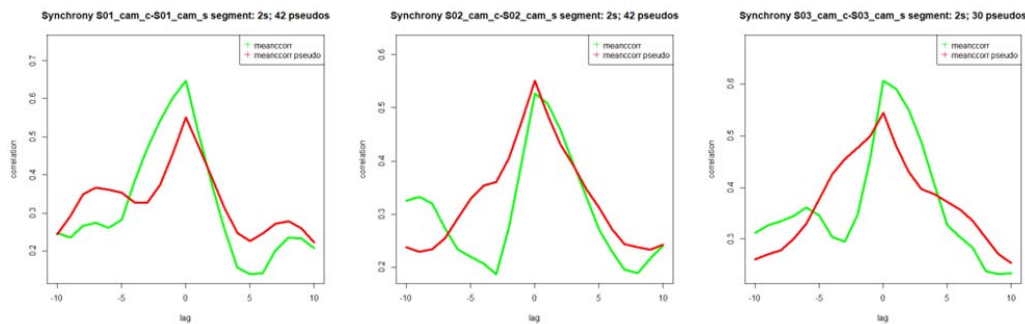
Fifteen pairs of RSA time series corresponding to the sessions between the participant and the companion were obtained and then analysed using the SUSY algorithm [87] developed by Meier and Tschacher. It has been possible to perform the correlation function between the RSA pair (neurotypical-neuroatypical) with different values and amplitudes by normalizing both signals to bring them to a similar scale. Within the SUSY algorithm, there exists a preliminary normalization stage. Once both signals are normalized, the correlation function can be applied, enabling the comparison of their patterns and synchronization without being affected by the original differences in amplitude. This normalization step ensures that the analysis focuses on the shape and timing of the signals rather than their raw amplitudes, allowing for significant correlation analysis even when the signals have different scales and amplitudes.

Figure 3 shows the correlation function of RSA time series for a single participant-companion dyad for their three collaborative sessions. We chose lags  $-1 \text{ minute} \leq L \leq 1 \text{ minute}$ , segment size 3 min, and did not restrict the number of surrogates. Mean synchrony was  $Zabs = .390$  ( $SD = .034$ ; Cohen's  $d = 0.08$ ) and, for the non-absolute correlations,  $Znoabs = -.009$  ( $SD = .075$ ; Cohen's  $d = -0.51$ ). The synchrony effect sizes across all sessions  $ESabs$  were significant and positive (mean  $ESabs = .47$ ,  $SD = .30$ ;  $p < .05$ ), as well as  $ESnoabs$  (mean  $ESnoabs = 0.25$ ,  $SD = 3.19$ ;  $p < .05$ ), which supports H1 concerning the presence of physiological synchrony.

The three graphs in Figure 4 represent dyadic synchrony in different sessions using the CVS. The green graph depicts real RSA-based synchrony cross-correlations as a function of the respective lag.

The red graph represents the average of all surrogate time series, indicating pseudo-synchronies (see methodology section). The left (A) and right (C) panels display physiological synchrony based on RSA between the autistic individual and the neurotypical participant in the first and third sessions, respectively. The green graph is above the red, indicating significant in-phase synchrony (positive correlations). In the central panel (B), physiological synchrony based on RSA between the autistic individual and the neurotypical participant during the second session is depicted. Here, the green graph is below the red pseudo-synchrony graph, showing anti-phase synchrony (negative correlations). The rationale

behind using SUSY was to generate surrogate time series that retain certain statistical properties of the original data (such as mean, variance, and distribution) while eliminating temporal dependencies or correlations in the original time series (RSA calculations). These surrogate time series serve as a reference to assess whether the observed synchrony or correlations in the original data are statistically significant or could have occurred by chance. We conducted this analysis to distinguish between real synchronization or correlations in time series data and spurious or random correlations that might arise due to noise or other factors.



**Fig. 4:** Absolute cross-correlations Z-values by L-delay of aggregated RSA time series of one participant from their three virtual companionship sessions (green) and for all surrogates (red). The effect size (ES) are the areas under the green curve minus the areas under the red curves (surrogate), divided by the standard deviations of the Z-surrogate. These results and graphs were obtained using the SUSY code developed by [84] and [83].

#### b) Brain activity responses

While the Mindwave Mobile 2 utilizes its own scale to measure levels of attention and relaxation based on user EEG data, it's essential to recognize that this scale is not universally standardized and may not be consistently applicable to all individuals. EEG responses can vary significantly among individuals, and the device's scale is calibrated based on general patterns observed in the general population, potentially overlooking individual variations. It is these relative measurements of attention and relaxation under the device's proprietary scale that we have included in our analyses. Figure 5 show value curves of the eSense Attention and Meditation metrics obtained from one participant during 3 virtual companionship sessions.

A one-way ANOVA was conducted to test for differences between levels of the eSense Attention and Meditation metrics between sessions. For the eSense Attention metric the group means were 49.38 95% CI(48.74, 50.03) for the first session; 47.11 95% CI(46.53, 47.69) for the second session; and 47.21 95% CI(46.29, 48.13) for the third session. Figure 6 shows boxplots of the eSense Attention and Meditation metrics collected with the Mindwave sensor for all sessions and participants. There is a statistically significant difference between the session means,  $F = 13.75$ ,  $p\text{-value} < 0.05$ . For the eSense Meditation metric the group means were 54.86 95% CI(54.34, 55.38) for the first session; 53.79

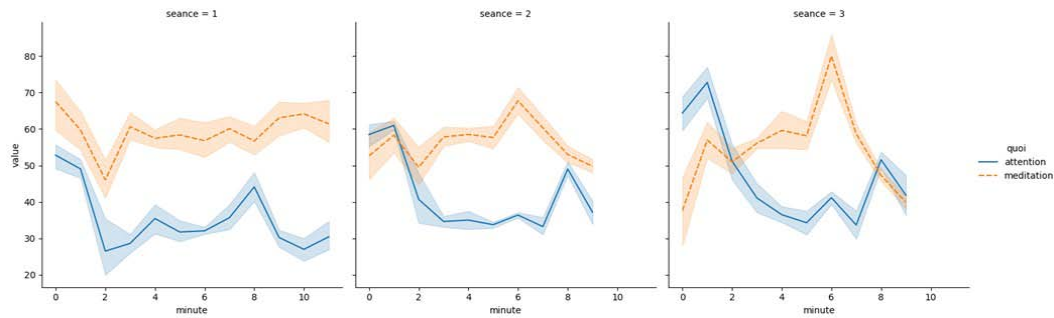
95% CI(53.19, 54.38) for the second session; and 54.44 95% CI(53.74, 55.15) for the third session. For this eSense metric, there is also a statistically significant difference between the session means,  $F = 3.39$ ,  $p\text{-value} = 0.03$ . Figure 7 show confidence intervals for the eSense Attention and Meditation metric values of the 5 participants during VC sessions.

The use of Tukey HSD to test for differences between groups (sessions) indicates that there is a statistically significant difference in both eSense Attention and Meditation metrics between the first and second virtual coaching session, which may suggest that levels of mental workload and levels of relaxation have progressively decreased between sessions, which partially supports H2 concerning an improvement in the brain activity patterns.

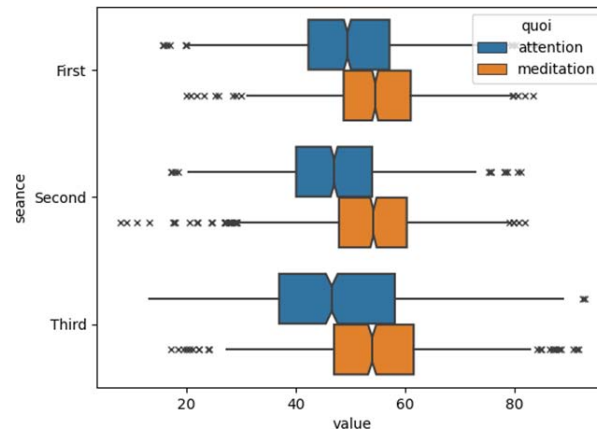
#### c) Questionnaire

Table 2 presents the scores obtained from the VC post-use questionnaire on usability of the social interactions assessment system, based on the responses of participants. The survey used a rating scale ranging from 1 to 7, where 1 represents the lowest score and 7 the highest score. The table includes the mean scores for each survey item, and the data was collected from a total of 5 participants ( $n = 5$ ).





**Fig. 5:** Curves of the values of the eSense Attention and Meditation metrics obtained from one participant during 3 virtual companionship sessions (the physiological synchrony of the brain activity of the participant- companion dyad was not explored in this study). The solid line represents the time series corresponding to the eSense Attention values (mental load), the dotted line represents the time series corresponding to the eSense Meditation values (relaxation).



**Fig. 6:** Boxplot of the eSense Attention and Meditation metrics collected with the Mindwave sensor corresponding to the first, second, and third sessions of all participants (Note: in this work we did not study the response of the brain activity of the companion or the physiological synchrony of their brain activity markers with participants').

The questionnaire assessed various aspects related to social interactions within the context of the virtual companionship (VC) system. Participants were asked to rate their experiences and perceptions on different dimensions, such as understanding their strengths and challenges, the comfort of remote interactions, usefulness of the company's welcome, self-regulation of physiological reactions, overall positive experience, ability to share emotional states with the companion, willingness to use the system, compatibility

with professional expectations, adaptability to remote learning, responsiveness to individual needs, interest in the provided activities, relevance of skill development, satisfaction with companion support, and appreciation of companion discussions.

The mean scores for each item provide insights into the participants' overall evaluation of the VC system's effectiveness and their satisfaction with the social interactions facilitated by the system.

**Table 2:** Scores on the VC post-use questionnaire on social interactions

Survey - Student Version (1 to 7)		Mean (n = 5)
1.	Better Know My Strengths	4,4
2.	Better Know My Challenges	4,8
3.	Same As In-person Attendance	4,2
4.	Remote Interaction Is Comfortable	4,6
5.	Company Welcome-Like Usefulness	5,2
6.	Physiological Reactions Self-Regulation	4,2
7.	Overall Positive Experience	5,4
8.	I Could Share My Emotional State To The Companion	4,8
9.	I Would Use This System	4,3
10.	Compatible With My Professional Expectations	4,6
11.	Adapted To Remote Learning	4,4
12.	Adapted To My Needs	5,0

13. Interesting And Impelling Activities	4,4
14. Relevant Skills Development	5,0
15. Companion Support Satisfaction	6,9
16. Companion Discussion Appreciation	7,0

Higher mean scores indicate more positive feedback and stronger agreement with the respective statements. The results from this questionnaire can help assess the success and user experience of the VC system, particularly in terms of the perceived quality of social interactions and emotional well-being.

#### IV. DISCUSSION

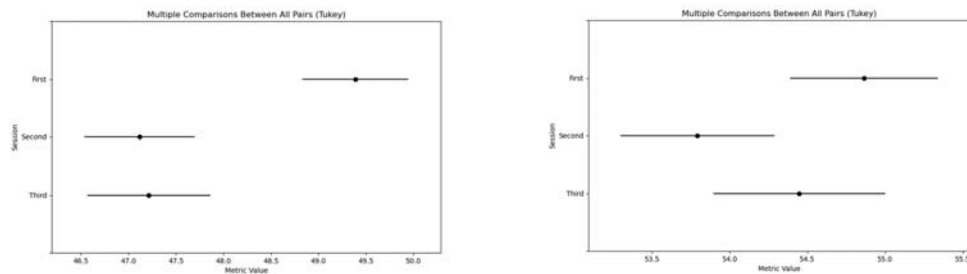
The primary aim of developing the Virtual Companion (VC) was to enhance workplace adaptation for the autistic through the employment of immersive technologies and fostering self-awareness of their emotional-cognitive state based on physiological measurements. Immersive technologies offer a controlled and secure platform for training and accommodation, proving advantageous for effective workplace adaptation. This initiative was driven by the growing demand from inclusive companies to support the integration of neurotypicals facing burnout in the workplace. Burnout, stemming from factors like masking and the deliberate suppression of sensitivities, prompted the need for innovative solutions. A significant challenge identified by inclusive company representatives, corroborated in literature including Guimond et al. [25], is the inherent difficulty for both the autistic employee and the company representatives' counterpart to gauge emotional states during the integration process. To address this, we introduced a real-time physiological measures panel, serving two key functions. Firstly, it allows the autistic to establish a baseline of their parasympathetic activity based on physiological markers about their environmental engagement, relational capacity, and emotional well-being. This information is integrated within a collaborative VR system, aiding in the resolution of potential challenges during interactions and facilitating their workplace adaptation. Secondly, it highlights the feasibility of achieving quality interactions within a collaborative and remote context between the neurotypical-neuroatypical pair, utilizing cardiac vagal tone signals. This quality interaction is predicated on physiological synchrony, a phenomenon previously documented exclusively in face-to-face settings. By implementing the validated SUSY algorithm, commonly used for studying physiological synchrony in psychotherapy sessions [84], we discovered that physiological synchrony between the dyad surpasses surrogate values. This synchronization underscores the subconscious alignment of bodily responses during social interactions, illuminating the establishment of profound social bonds and emotional resonance

beyond conscious awareness. While traditional physiological synchrony is often observed in close-proximity face-to-face interactions, research reveals its persistence in remote settings, such as video calls or other communication mediums [74]. Facial expressions, emotional cues like tone of voice, and gestures contribute to a sense of synchrony and connection even in physically separated contexts. The degree of physiological synchrony is influenced by factors including communication technology quality, interaction dynamics, and interpersonal rapport. Although remote physiological synchrony may not match the robustness of in-person interactions, it underscores humans' exceptional capacity to connect and resonate across distances. To enhance the accuracy and depth of insights, we have employed respiratory sinus arrhythmia (RSA) to study physiological synchrony, as it provides distinct insights compared to other physiological indicators like heart rate. RSA, characterized by heart rate fluctuations during respiration phases, offers a window into coordinated breathing patterns during social interactions, which sheds valuable light on the emotional and cognitive processes underlying the formation of social bonds. In contrast to relying solely on conventional physiological markers like heart rate (HR) or skin conductance (EDA), the use of respiratory sinus arrhythmia (RSA) offers a more nuanced insight into interpersonal dynamics. While heart rate alone reflects overall physiological activation and responses, RSA captures the influence of the parasympathetic branch of the autonomic nervous system on heart rate variability. This signifies that RSA is closely associated with emotional regulation, social engagement, and cognitive flexibility. Consequently, investigating RSA synchrony in this study, has provided a valuable window into the intricate interplay of emotions and cognitive states during social interactions. Therefore, one of our main contributions is aligned with the exploration of high-quality remote social interactions facilitated by a virtual reality headset and remote connectivity. Furthermore, it contributes to the existing body of research by demonstrating the utility of respiratory sinus arrhythmia in studying physiological synchrony that underpins emotional and cognitive interconnectedness between the autistic-neurotypical dyad. While interpreting the results of this study warrants careful consideration due to its methodological and contextual dependencies, the findings reinforce the foundational concept that immersive and collaborative applications, exemplified by the VC system, hold the potential to assist neuroatypical individuals in adapting to workplace demands. This



potential is derived from the opportunity we have provided the autistic to compare their subjectively perceived emotional state with the objective data gathered by the system's sensors. However, the outcomes of the analysis of brain activity lend partial support to this hypothesis. Notably, a gradual decline in Attention metric levels was observed across sessions. The initial session exhibited the highest value, averaging 49.5, which progressively reduced to an average of 47 during the subsequent sessions. The Attention eSense metric typically involves monitoring the ratio of specific brainwave frequencies, such as beta waves, mainly present during wakefulness and active mental engagement, linked to conscious thought, cognitive processing, problem-solving, and decision-making. They predominate during focused attention and cognitive tasks. Consequently, a higher Attention eSense value would generally indicate heightened engagement, focus, and attentiveness, while a lower value suggests a more relaxed or distracted state. The observed decline in the Attention eSense metric across

sessions could imply a diminishing level of focused cognitive engagement, possibly indicating reduced concentration, potential distraction, or a transition toward a more relaxed mental state. This decline is likely attributable to the latter, as the experimental observations did not indicate disinterest or distraction. Instead, this trend may signify a growing familiarity with the system, with the proposed activities within, and with the virtual environment's co-participant. In contrast, a reduction in the eSense Meditation metric values was also detected, with the highest values (55) recorded during the initial session and the lowest (53.75) during the subsequent session. While the mean values demonstrated a potential increase toward the third session, this increase was not statistically significant. A progressive decrease in the Meditation eSense metric potentially indicates a diminishing level of mental relaxation and calmness between VC sessions. This trend may suggest heightened restlessness, distraction, or challenges in achieving a deeper state of mindfulness.



**Fig. 7:** (Left) Confidence intervals with individual confidence levels of 95 percent for the eSense Attention metric values of the 5 participants during the first, second, and third virtual companionship sessions. A significant difference is observed between the first and the second session, between the first and the third session, but not between the second and the third session. (Right) Confidence intervals with individual confidence levels of 95 percent for the eSense Meditation metric values of the 5 participants during the first, second, and third virtual companionship sessions. A significant difference is observed only between the first and second session.

However, a simultaneous shift toward a more relaxed mental state (decreased Attention) while experiencing a reduction in physiological relaxation (decreased Meditation) during a social interaction could be explained by emotional engagement and cognitive stimulation. In the context of utilizing the VR system for social interaction, engaging in conversations or stimulating activities may have contributed to a sense of mental relaxation and positive emotions, even if the physiological relaxation response diminished. Notably, these socially stimulating interactions might prompt the neurotypical to activate their cognitive and emotional faculties, potentially leading to a more relaxed mental state despite shifts in physiological parameters. This dynamic aligns with the concept of eustress, a positive form of stress that can emerge during social interactions involving excitement, engagement, or a sense of accomplishment. Consequently, these interactions could guide the autistic towards a state of heightened

mental alertness and relaxation, while a decrease in physiological relaxation might be attributed to increased cognitive and emotional engagement [16]. Yet, we acknowledge the potential influence of individual variability among participants and external stressors unrelated to social interactions or the use of the system, which may have impacted physiological relaxation. However, the interactions themselves appear to provide a form of mental respite despite these mixed physiological responses. Several notable limitations are inherent in this study: The relatively small sample size in the context of autism research involving virtual reality (VR) restricts the comprehensive exploration of responses and individual nuances within the diverse autistic population. The significant variability in cognitive, sensory, and emotional profiles among neurotypicals can profoundly influence their interactions within immersive environments. Consequently, our modest sample size ( $n=5$ ) may only offer a limited

representation of this intricate variability, potentially limiting the extent to which we can draw robust and generalizable conclusions regarding the effectiveness and relevance of the VR interventions aimed at enhancing their employability. A second noteworthy limitation revolves around the variability in session duration for the VC interventions (ranging from 15 to 45 minutes) and the lack of standardized scheduling. This irregularity in session length and timing could have presented challenges in establishing routines and predictability, which are often crucial for the neurotypical. Adhering to consistent session duration and timing could foster a stable and comfortable environment, thereby enhancing focus, participation, and the overall efficacy of the VR intervention. Moreover, it would contribute to the reliability of physiological marker readings across sessions.

In the context of analyzing Respiratory Sinus Arrhythmia (RSA) synchrony between a neurotypical-neuroatypical dyad using a Collaborative Virtual Simulation (CVS), careful attention must be given to the windowing process employed in surrogate synchrony (SUSY) analyses. The selection of an optimal window size is paramount; too small windows may neglect to encapsulate the entirety of the physiological phenomena, leading to incomplete analyses, while excessively large windows could incorporate an overwhelming amount of data, potentially obscuring the synchrony effects. Given the non-stationary nature of physiological data, especially RSA, the assumption of data stationarity within each window could introduce bias, necessitating sophisticated approaches to mitigate this issue. Edge effects, where data at the boundaries of windows are less accurately represented, further compound the challenge, demanding meticulous handling to ensure reliability in synchrony detection.

The decision on whether to allow overlap between windows and determining the extent of this overlap is another critical consideration. While overlapping windows can yield a smoother temporal representation of synchrony, they also introduce redundancy that could bias the results. Short-term artifacts or outliers in the data can disproportionately influence the outcomes, leading to potential misinterpretations of synchrony. The choice of window function, whether it be rectangular, Hamming, or Hanning, is equally crucial as it directly impacts the fidelity of the analysis, potentially leading to information loss or distortion.

Furthermore, the sampling rate of the physiological data necessitates careful deliberation. Insufficient sampling could result in missed nuances, while excessive sampling could render the analysis computationally burdensome. Ensuring consistency in windowing parameters across subjects and sessions is vital to maintain the integrity of the comparison and interpretation of results.

Given these intricate considerations, adopting rigorous and well-validated windowing parameters and methods is imperative in the pursuit of a robust surrogate synchrony analysis, particularly when investigating the complex physiological interactions in a neurotypical-neuroatypical dyad within a CVS environment.

Lastly, the inclusion of a single companion for interactions may have inherently constrained our understanding of workplace social interaction dynamics. The absence of multiple companions may have hindered the opportunity to contrast different companionship styles, assistance strategies, interaction dynamics, and their resulting effects on workplace adaptation outcomes. Neglecting the inherent variability and nuances arising from diverse interactions might limit the broad applicability of our findings to a wider array of workplace scenarios. Thus, the involvement of representatives from various companies could mitigate potential limitations and enrich the depth of analysis regarding the diverse contributions of different companies to workplace dynamics.

## V. CONCLUSION

The Virtual Companion (VC) system was meticulously crafted as an innovative, real-time VR simulation platform, meticulously designed to facilitate a nuanced understanding of social dynamics for autistic individuals within professional environments. Through the integration of self-calibrating mechanisms and immersive technologies, the system provides a secure and controlled training milieu, thereby enhancing workplace adaptation and integration (Objective 1). The VC system plays a pivotal role in fostering augmented self-awareness among autistic employees by delivering real-time physiological metrics, enabling individuals to establish a baseline of parasympathetic activity and gain insights into their emotional and cognitive states. This, in turn, facilitates the establishment of physiological synchrony between neuroatypical and neurotypical individuals during simulated social interactions, as evidenced by the successful application of the SUSY algorithm and the observation of physiological synchrony surpassing surrogate values (Objective 2).

In evaluating the quality of social interactions and the overall well-being of autistic employees within the workplace, the study leverages indices such as the Attention and Meditation eSense metrics, providing a window into the participants' mental and emotional states. The system's design and implementation underscore its potential to guide autistic individuals toward a relaxed mental state, even in the face of reduced physiological relaxation, highlighting the complex interplay between cognitive engagement and emotional well-being (Objective 3). The study does explicitly detail a formal usability assessment from the



autistic individuals' perspective, highlighting the intuitive design and the tailored feedback mechanism of the VC system implying a user-centric approach, ensuring relevance and accessibility (Objective 4).

The research also offers a comprehensive analysis of the inherent limitations and challenges associated with the deployment of VR-based adaptation systems in real-world professional settings. Among the challenges highlighted are the small sample size, the variability in session durations, and the intricate nature of analyzing (RSA) synchrony using surrogate synchrony analyses (Objective 5). The authors advocate for rigorous and validated methodologies to address these challenges, paving the way for future advancements in this domain. Ultimately, this research epitomizes a commitment to fostering an inclusive work culture, celebrating neurodiversity, and catering to a broad spectrum of cognitive and sensory needs, thereby contributing significantly to the body of knowledge in this field.

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### REFERENCES RÉFÉRENCES REFERENCIAS

1. Drew H Abney, Gregory F Lewis, and Bennett I Bertenthal. 2021. A method for measuring dynamic respiratory sinus arrhythmia (RSA) in infants and mothers. *Infant Behavior and Development* 63 (2021), 101569.
2. Neelu Jyothi Ahuja, Sarthika Dutt, Shailee Lohmor Choudhary, and Manoj Kumar. 2022. Intelligent tutoring system in education for disabled learners using human-computer interaction and augmented reality. *International Journal of Human-Computer Interaction* (2022), 1–13.
3. Goudarz Alibakhshi, Akram Labbafi, and Hooria Polouei. 2023. Teachers and educators' experiences and perceptions of Artificial-powered interventions for Autism groups. (2023).
4. Ashwaq Z Amat, Deeksha Adiani, Mahrugh Tauseef, Michael Breen, Spencer Hunt, Amy Swanson, Amy S Weitlauf, Zachary E Warren, and Nilanjan Sarkar. 2023. Design of a Desktop Virtual Reality-based Collaborative Activities Simulator (ViRCAS) to Support Teamwork in Workplace Settings for Autistic Adults. *IEEE Transactions on Neural Systems and Rehabilitation Engineering* (2023).
5. Samuel RC Arnold, Julianne M Higgins, Janelle Weise, Aishani Desai, Elizabeth Pellicano, and Julian N Trollor. 2023. Confirming the nature of autistic burnout. *Autism* (2023), 13623613221147410.
6. Samuel RC Arnold, Julianne M Higgins, Janelle Weise, Aishani Desai, Elizabeth Pellicano, and Julian N Trollor. 2023. Towards the measurement of autistic burnout. *Autism* (2023), 13623613221147401.
7. Mary J Baker-Ericzén, Roxanne ElShamy, and Rebecca R Kammes. 2022. Current status of evidence-based practices to enhance employment outcomes for transition age youth and adults on the autism spectrum. *Current Psychiatry Reports* 24, 3 (2022), 161–170.
8. Eran Bar-Kalifa, Jessica N Prinz, Dana Atzil-Slonim, Julian A Rubel, Wolfgang Lutz, and Eshkol Rafaeli. 2019. Physiological synchrony and therapeutic alliance in an imagery-based treatment. *Journal of Counseling Psychology* 66, 4 (2019), 508.
9. Nirit Bauminger, Cory Shulman, and Galit Agam. 2004. The link between perceptions of self and of social relationships in high-functioning children with autism. *Journal of Developmental and Physical Disabilities* 16 (2004), 193–214.
10. Lal Bozgeyikli, Evren Bozgeyikli, Matthew Clevenger, Shangdong Gong, Andrew Raji, Redwan Alqasemi, Stephen Sundararao, and Rajiv Dubey. [n. d.]. Vr4vr: Towards vocational rehabilitation of individuals with disabilities in immersive virtual reality environments. In *2014 2nd Workshop on Virtual and Augmented Assistive Technology (VAAT)*. IEEE, 29–34.
11. Vasiliki Bravou, Despoina Oikonomidou, and Athanasios S Drigas. 2022. Applications of virtual reality for autism inclusion. A review. *Retos: nuevas tendencias en educación física, deporte y recreación* 45 (2022), 779–785.
12. Giuliana Galli Carminati, Fabienne Gerber, Marc André Baud, and Olivier Baud. 2007. Evaluating the effects of a structured program for adults with autism spectrum disorders and intellectual disabilities. *Research in Autism Spectrum Disorders* 1, 3 (2007), 256–265.
13. Amarie Carnett, L Neely, S Gardiner, M Kirkpatrick, J Quarles, and K Christopher. 2022. Systematic Review of Virtual Reality in Behavioral Interventions for Individuals With Autism-Advances in Neurodevelopmental Disorders.
14. Erik W Carter, Michelle N Harvey, Julie Lounds Taylor, and Katherine Gotham. 2013. Connecting youth and young adults with autism spectrum disorders to community life. *Psychology in the Schools* 50, 9 (2013), 888–898.

15. Ying-Chih Cheng, Yu-Chen Huang, and Wei-Lieh Huang. 2020. Heart rate variability in individuals with autism spectrum disorders: A meta-analysis. *Neuroscience Biobehavioral Reviews* 118 (2020), 463–471.
16. Ira L Cohen, J Helen Yoo, Matthew S Goodwin, and Lauren Moskowitz. 2011. Assessing challenging behaviors in Autism Spectrum Disorders: Prevalence, rating scales, and autonomic indicators. *International handbook of autism and pervasive developmental disorders* (2011), 247–270.
17. Joana Coutinho, Patrícia Oliveira-Silva, Eugénia Fernandes, Oscar F Gonçalves, Diogo Correia, Kristin Perrone Mc-Govern, and Wolfgang Tschacher. 2019. Psychophysiological synchrony during verbal interaction in romantic relationships. *Family process* 58, 3 (2019), 716–733.
18. Matthew R Cribbet, Paula G Williams, Heather E Gunn, and Holly K Rau. 2011. Effects of tonic and phasic respiratory sinus arrhythmia on affective stress responses. *Emotion* 11, 1 (2011), 188.
19. Molly Davis, Kara West, Joanie Bilms, Diana Morelen, and Cynthia Suveg. 2018. A systematic review of parent–child synchrony: It is more than skin deep. *Developmental Psychobiology* 60, 6 (2018), 674–691.
20. Anders Dechsling, Stian Orm, Tamara Kalandadze, Stefan Sütterlin, Roald A Øien, Frederick Shic, and Anders Nordahl-Hansen. 2021. Virtual and augmented reality in social skills interventions for individuals with autism spectrum disorder: A scoping review. *Journal of autism and developmental disorders* (2021), 1–16.
21. John W Denver, Shawn F Reed, and Stephen W Porges. 2007. Methodological issues in the quantification of respiratory sinus arrhythmia. *Biological psychology* 74, 2 (2007), 286–294.
22. Muhterem Dindar, Sanna Järvelä, and Eetu Haataja. 2020. What does physiological synchrony reveal about metacognitive experiences and group performance? *British Journal of Educational Technology* 51, 5 (2020), 1577–1596.
23. Jessica Dreaver, Craig Thompson, Sonya Girdler, Margareta Adolfsson, Melissa H Black, and Marita Falkner. 2020. Success factors enabling employment for adults on the autism spectrum from employers' perspective. *Journal of autism and developmental disorders* 50 (2020), 1657–1667.
24. Hadeel Faras, Nahed Al Ateeqi, and Lee Tidmarsh. 2010. Autism spectrum disorders. *Annals of Saudi medicine* 30, 4 (2010), 295–300.
25. Jonathan Proulx Guimond, Jocelyn Kiss, Reyes Consuelo, Miguel Alejandro, Dominique Michaud, Rency Inson Michel, Alexandre Ménard, Isabelle Feillou, Geoffrey Edwards, and James Hutson. 2023. Enhancing Employability for Autistic Graduates: Using TRIZ Theory to Design Virtual Reality Solutions for Fostering Inclusive Communications in Workplace Environments. *Global Journal of HUMAN-SOCIAL SCIENCE: H Interdisciplinary* 23, 4 (2023).
26. Lisa Guy, Margaret Souders, Lauren Bradstreet, Christine DeLussey, and John D Herrington. 2014. Brief report: Emotion regulation and respiratory sinus arrhythmia in autism spectrum disorder. *Journal of Autism and Developmental Disorders* 44 (2014), 2614–2620.
27. Darren Hedley, Mirko Uljarević, and David FE Hedley. 2017. Employment and living with autism: Personal, social and economic impact. *Inclusion, disability and culture: An ethnographic perspective traversing abilities and challenges* (2017), 295–311.
28. Jonathan L Helm, Jonas G Miller, Sarah Kahle, Natalie R Troxel, and Paul D Hastings. 2018. On measuring and modeling physiological synchrony in dyads. *Multivariate Behavioral Research* 53, 4 (2018), 521–543.
29. Jonathan L Helm, David A Sbarra, and Emilio Ferrer. 2014. Coregulation of respiratory sinus arrhythmia in adult romantic partners. *Emotion* 14, 3 (2014), 522.
30. Julianne M Higgins, Samuel RC Arnold, Janelle Weise, Elizabeth Pellicano, and Julian N Trollor. 2021. Defining autistic burnout through experts by lived experience: Grounded Delphi method investigating Autistic Burnout. *Autism* 25, 8 (2021), 2356–2369.
31. Holly Hodges, Casey Fealko, and Neelkamal Soares. 2020. Autism spectrum disorder: definition, epidemiology, causes, and clinical evaluation. *Translational pediatrics* 9, Suppl 1 (2020), S55.
32. Julie A Hofheimer, Brian R Wood, Stephen W Porges, Ellyn Pearson, and Edward E Lawson. 1995. Respiratory sinus arrhythmia and social interaction patterns in preterm newborns. *Infant Behavior and Development* 18, 2 (1995), 233–245.
33. David W Johnson and Roger T Johnson. 2008. *Social interdependence theory and cooperative learning: The teacher's role*. Springer, 9–37.
34. Karen R Johnson, Demetria Ennis-Cole, and Matthew Bonhamgregory. 2020. Workplace success strategies for employees with autism spectrum disorder: A new frontier for human resource development. *Human Resource Development Review* 19, 2 (2020), 122–151.
35. Kate E Kidwell, Rebecca L Clancy, and Gwenith G Fisher. 2023. The devil you know versus the devil you don't: Disclosure versus masking in the workplace. *Industrial and Organizational Psychology* 16, 1 (2023), 55–60.
36. Emma Kinnaird, Catherine Stewart, and Kate Tchanturia. 2019. Investigating alexithymia in autism: A systematic review and meta-analysis. *European Psychiatry* 55 (2019), 80–89.
37. Johann R Kleinbub and Fabian T Ramseyer. 2021. rMEA: An R package to assess nonverbal synchronization in motion energy analysis time-

- series. *Psychotherapy research* 31, 6 (2021), 817–830.
38. L Perry Lattimore, Marsha B Parsons, and Dennis H Reid. 2002. A prework assessment of task preferences among adults with autism beginning a supported job. *Journal of Applied Behavior Analysis* 35, 1 (2002), 85–88.
39. Wenn B Lawson. 2020. Adaptive morphing and coping with social threat in autism: An autistic perspective. *Journal of Intellectual Disability-Diagnosis and Treatment* 8, 3 (2020), 519–526.
40. Justin B Leaf, Joseph H Cihon, Julia L Ferguson, and Peter F Gerhardt. 2022. *Handbook of Quality of Life for Individuals with Autism Spectrum Disorder: An Introduction*. Springer, 1–6.
41. Chen Li, Meike Belter, Jing Liu, and Heide Lukosch. 2023. Immersive Virtual Reality Enabled Interventions for Autism Spectrum Disorder: A Systematic Review and Meta-Analysis. *Electronics* 12, 11 (2023), 2497.
42. Daniel E Lidstone and Stewart H Mostofsky. 2021. Moving toward understanding autism: Visual-motor integration, imitation, and social skill development. *Pediatric Neurology* 122 (2021), 98–105.
43. Miriam Liss, Jennifer Mailloux, and Mindy J Erchull. 2008. The relationships between sensory processing sensitivity, alexithymia, autism, depression, and anxiety. *Personality and individual differences* 45, 3 (2008), 255–259.
44. Lucy Anne Livingston, Punit Shah, Victoria Milner, and Francesca Happé. 2020. Quantifying compensatory strategies in adults with and without diagnosed autism. *Molecular autism* 11, 1 (2020), 1–10.
45. Catherine Lord, Traolach S Brugha, Tony Charman, James Cusack, Guillaume Dumas, Thomas Frazier, Emily JH Jones, Rebecca M Jones, Andrew Pickles, and Matthew W State. 2020. Autism spectrum disorder. *Nature reviews Disease primers* 6, 1 (2020), 1–23.
46. Theo Lorenc, Mark Rodgers, David Marshall, Hollie Melton, Rebecca Rees, Kath Wright, and Amanda Sowden. 2018. Support for adults with autism spectrum disorder without intellectual impairment: Systematic review. *Autism* 22, 6 (2018), 654–668.
47. Gonzalo G Lorenzo, Nigel N Newbutt, and Alejandro A Lorenzo-Lledó. 2023. Designing virtual reality tools for students with Autism Spectrum Disorder: A systematic review. *Education and Information Technologies* (2023), 1–49.
48. Beatriz López and Liz Keenan. 2014. Barriers to employment in autism: Future challenges to implementing the Adult Autism Strategy. *Autism Research Network* (2014), 1–17.
49. Grace Mak and Lea Zhao. 2023. A systematic review: the application of virtual reality on the skill-specific performance in people with ASD. *Interactive Learning Environments* 31, 2 (2023), 804–817.
50. Jane Mantzalas, Amanda L Richdale, Achini Adikari, Jennifer Lowe, and Cheryl Dissanayake. 2022. What is autistic burnout? A thematic analysis of posts on two online platforms. *Autism in Adulthood* 4, 1 (2022), 52–65.
51. Andreas Maroukhas, Christos Troussas, Akrivi Krouska, and Cleo Sgouropoulou. 2023. How personalized and effective is immersive virtual reality in education? A systematic literature review for the last decade. *Multimedia Tools and Applications* (2023), 1–49.
52. Analia Marzoratti and Tanya M Evans. 2022. Measurement of interpersonal physiological synchrony in dyads: A review of timing parameters used in the literature. *Cognitive, Affective, Behavioral Neuroscience* 22, 6 (2022), 1215–1230.
53. Oded Mayo and Ilanit Gordon. 2020. In and out of synchrony—Behavioral and physiological dynamics of dyadic interpersonal coordination. *Psychophysiology* 57, 6 (2020), e13574.
54. Oded Mayo, Michal Lavidor, and Ilanit Gordon. 2021. Interpersonal autonomic nervous system synchrony and its association to relationship and performance—a systematic review and meta-analysis. *Physiology Behavior* 235 (2021), 113391.
55. Patricia Mesa-Gresa, Hermenegildo Gil-Gómez, José-Antonio Lozano-Quilis, and José-Antonio Gil-Gómez. 2018. Effectiveness of virtual reality for children and adolescents with autism spectrum disorder: an evidence-based systematic review. *Sensors* 18, 8 (2018), 2486.
56. Cassandra Moiser. 2023. *Integration of a Neurodivergent Workforce in a Company*. Thesis.
57. Jewoong Moon, Gi Woong Choi, and Joo Young Seo. 2023. Revisiting multimedia learning design principles in virtual reality-based learning environments for autistic individuals. *Virtual Reality* (2023), 1–13.
58. Judith K Morgan, Daniel S Shaw, and Erika E Forbes. 2013. Physiological and behavioral engagement in social contexts as predictors of adolescent depressive symptoms. *Journal of Youth and Adolescence* 42 (2013), 1117–1127.
59. Robert G Moulder, Steven M Boker, Fabian Ramseyer, and Wolfgang Tschacher. 2018. Determining synchrony between behavioral time series: An application of surrogate data generation for establishing falsifiable null-hypotheses. *Psychological methods* 23, 4 (2018), 757.
60. Tom Muskett. 2016. Examining language and communication in autism spectrum disorder—in context. *Re-thinking autism: Diagnosis, identity and equality* (2016).
61. Emily Neuhaus, Raphael Bernier, and Theodore P Beauchaine. 2014. Brief report: social skills, internalizing and externalizing symptoms, and respiratory sinus arrhythmia in autism. *Journal of*



- Autism and Developmental Disorders* 44, 3 (2014), 730–737.
62. Marlena N Novack and Dennis R Dixon. 2019. Predictors of burnout, job satisfaction, and turnover in behavior technicians working with individuals with autism spectrum disorder. *Review Journal of Autism and Developmental Disorders* 6, 4 (2019), 413–421.
63. Michelle A Patriquin, Jill Lorenzi, Angela Scarpa, and Martha Ann Bell. 2014. Developmental trajectories of respiratory sinus arrhythmia: Associations with social responsiveness. *Developmental psychobiology* 56, 3 (2014), 317–326.
64. Michelle A Patriquin, Angela Scarpa, Bruce H Friedman, and Stephen W Porges. 2013. Respiratory sinus arrhythmia: A marker for positive social functioning and receptive language skills in children with autism spectrum disorders. *Developmental psychobiology* 55, 2 (2013), 101–112.
65. Stephen W Porges. 2009. The polyvagal theory: New insights into adaptive reactions of the autonomic nervous system. *Cleveland Clinic journal of medicine* 76, Suppl 2 (2009), S86.
66. Stephen W Porges and Robert E Bohrer. 1990. The analysis of periodic processes in psychophysiological research. (1990).
67. Valéry Psyché, Ben Daniel, and Jacqueline Bourdeau. [n. d.]. Adaptive learning spaces with context-awareness. In *Intelligent Tutoring Systems: 15th International Conference, ITS 2019, Kingston, Jamaica, June 3–7, 2019, Proceedings* 15. Springer, 7–13.
68. Fabian Ramseyer and Wolfgang Tschacher. 2011. Nonverbal synchrony in psychotherapy: coordinated body movement reflects relationship quality and outcome. *Journal of consulting and clinical psychology* 79, 3 (2011), 284.
69. Dora M Raymaker, Alan R Teo, Nicole A Steckler, Brandy Lentz, Mirah Scharer, Austin Delos Santos, Steven K Kapp, Morrigan Hunter, Andee Joyce, and Christina Nicolaidis. 2020. “Having all of your internal resources exhausted beyond measure and being left with no clean-up crew”: Defining autistic burnout. *Autism in adulthood* 2, 2 (2020), 132–143.
70. Veerle Ross, Daniel J Cox, Ron Reeve, Timothy Brown, Matthew Moncrief, Rose Schmitt, and Gary Gaffney. 2018. Measuring the attitudes of novice drivers with autism spectrum disorder as an indication of apprehensive driving: Going beyond basic abilities. *Autism* 22, 1 (2018), 62–69.
71. Mario Saiano, Eleonora Garbarino, Simonetta Lumachi, Silvano Solari, and Vittorio Sanguineti. [n. d.]. Effect of interface type in the VR-based acquisition of pedestrian skills in persons with ASD. In *2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE, 5728–5731.
72. Mario Saiano, Laura Pellegrino, Maura Casadio, Susanna Summa, Eleonora Garbarino, Valentina Rossi, Daniela Dall’Agata, and Vittorio Sanguineti. 2015. Natural interfaces and virtual environments for the acquisition of street crossing and path following skills in adults with Autism Spectrum Disorders: a feasibility study. *Journal of neuroengineering and rehabilitation* 12 (2015), 1–13.
73. Désirée Schoenherr, Jane Paulick, Susanne Worrack, Bernhard M Strauss, Julian A Rubel, Brian Schwartz, Anne- Katharina Deisenhofer, Wolfgang Lutz, Ulrich Stangier, and Uwe Altmann. 2019. Quantification of nonverbal synchrony using linear time series analysis methods: Lack of convergent validity and evidence for facets of synchrony. *Behaviorresearch methods* 51 (2019), 361–383.
74. Jonathan G Shalom, Haggai Israeli, Omer Markovitzky, and Joshua D Lipsitz. 2015. Social anxiety and physiological arousal during computer mediated vs. face to face communication. *Computers in Human Behavior* 44 (2015), 202–208.
75. Yung-Ji Sher, En-Tzu Lin, Jon-Chao Hong, Ting-Fang Wu, and Kai-Hsin Tai. [n. d.]. Effects of Virtual Reality on Training in Food Preparation Curriculum for Vocational High School Students with Autism Spectrum Disorder. ([n. d.]).
76. Marco Simões, Miguel Bernardes, Fernando Barros, and Miguel Castelo-Branco. 2018. Virtual travel training for autism spectrum disorder: proof-of-concept interventional study. *JMIR serious games* 6, 1 (2018), e8428.
77. Matthew J Smith, Emily J Ginger, Katherine Wright, Michael A Wright, Julie Lounds Taylor, Laura Boteler Humm, Dale E Olsen, Morris D Bell, and Michael F Fleming. 2014. Virtual reality job interview training in adults with autism spectrum disorder. *Journal of autism and developmental disorders* 44 (2014), 2450–2463.
78. Ivo V Stuldreher, Nattapong Thammasan, Jan BF Van Erp, and Anne-Marie Brouwer. 2020. Physiological synchrony in EEG, electrodermal activity and heart rate detects attentionally relevant events in time. *Frontiers in Neuroscience* 14 (2020), 575521.
79. R Development Core Team. 2010. R: A language and environment for statistical computing. (*No Title*) (2010).
80. Alon Tomashin, Ilanit Gordon, and Sebastian Wallot. 2022. Interpersonal physiological synchrony predicts group cohesion. *Frontiers in human neuroscience* 16 (2022), 903407.
81. Michał T Tomczak. 2022. How can the work environment be redesigned to enhance the well-being of individuals with autism? *Employee Relations: The International Journal* 44, 6 (2022), 1467–1484.
82. Michał T Tomczak and Konrad Kulikowski. 2023. Toward an understanding of occupational burnout



among employees with autism—the Job Demands-Resources theory perspective. *Current Psychology* (2023), 1–13.

83. Wolfgang Tschacher and Hermann Haken. 2019. *The process of psychotherapy*. Springer.
84. Wolfgang Tschacher and Deborah Meier. 2020. Physiological synchrony in psychotherapy sessions. *Psychotherapy Research* 30, 5 (2020), 558–573.
85. Wolfgang Tschacher, Georg M Rees, and Fabian Ramseyer. 2014. Nonverbal synchrony and affect in dyadic interactions. *Frontiers in psychology* 5 (2014), 1323.
86. Pauli Virtanen, Ralf Gommers, Travis E Oliphant, Matt Haberland, Tyler Reddy, David Cournapeau, Evgeni Burovski, Pearu Peterson, Warren Weckesser, and Jonathan Bright. 2020. SciPy 1.0: fundamental algorithms for scientific computing in Python. *Nature methods* 17, 3 (2020), 261–272.
87. Hui Wang, Cynthia Suveg, Kara B West, Zhuo R Han, Xutong Zhang, Xiaoyi Hu, and Li Yi. 2021. Synchrony of respiratory sinus arrhythmia in parents and children with autism spectrum disorder: moderation by interaction quality and child behavior problems. *Autism Research* 14, 3 (2021), 512–522.
88. Tingting Wang, Shan Li, Xiaoshan Huang, Zexuan Pan, and Susanne P Lajoie. 2023. Examining students' cognitive load in the context of self-regulated learning with an intelligent tutoring system. *Education and Information Technologies* 28, 5 (2023), 5697–5715.
89. Susan W White, Carla A Mazefsky, Gabriel S Dichter, Pearl H Chiu, John A Richey, and Thomas H Ollendick. 2014. Social-cognitive, physiological, and neural mechanisms underlying emotion regulation impairments: Understanding anxiety in autism spectrum disorder. *International Journal of Developmental Neuroscience* 39 (2014), 22–36.
90. Lorna Wing. 1993. The definition and prevalence of autism: A review. *European child adolescent psychiatry* 2 (1993), 61–74.
91. Fumihiko Yasuma and Junichiro Hayano. 2004. Respiratory sinus arrhythmia: why does the heartbeat synchronize with respiratory rhythm? *Chest* 125, 2 (2004), 683–690.
92. Saima Zia, Muhammad Azeem Ahmad, and Anum Tariq. 2023. How Job Burnout Impacts the Goal-Focused Leader Behavior with the Mediating Role of Supervisor's Bottom-line Mentality. *Journal of Social Sciences Review* 3, 2 (2023), 282–296.



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## Characterization of Alcohol and Cigarette Users Attended in a Guararapes-Jaboatão Family Health Unit

By Stefânia Morais Pinto dos Santos

**Abstract-** The excessive use of both licit and illicit drugs has shown a great growth during the last years, the use of licit drugs is a complex issue, as it involves several subsystems of individual and social life. Studies in this area help in understanding the different socio-cultural aspects. This study aims to characterize the profile of alcohol and cigarette users seen at the Jardim Monte Verde-PE family health unit. In order to characterize the profile of the participants, a descriptive quantitative approach study was carried out at the USF Jardim Monte Verde. The sample consisted of 50 subjects (25 cigarette users and 25 alcohol users), aged between 18 and 60 years of both genders. Data collection was performed through semi-structured interviews and analysis of medical records. The results obtained by the scale with some variables related to smoking and alcohol consumption and the self-assessment of self detected the main psychosocial aspects related to cigarette and alcohol consumption. The production of knowledge regarding the profile of alcohol and cigarette users is considered, reflecting on actions and the work process that involves the theme of their use in primary care.

**Keywords:** *illicit drugs, health, physical activity.*

**GJHSS-H Classification:** LCC: R726.5-726.8



CHARACTERIZATION OF ALCOHOL AND CIGARETTE USERS ATTENDED IN AGUARARAPES JABOATÃO FAMILY HEALTH UNIT

*Strictly as per the compliance and regulations of:*



# Characterization of Alcohol and Cigarette Users Attended in a Guararapes-Jaboatão Family Health Unit

Caracterização de Usuários de Álcool e Cigarro Atendidos em Uma Unidade de Saúde da Família de Jaboatão dos Guararapes-Pe

Stefânia Moraes Pinto dos Santos

**Resumo-** O uso demasiado de drogas, tanto lícitas quanto ilícitas, apresentou um grande crescimento durante os últimos anos, o consumo das drogas lícitas é uma questão complexa, pois envolve vários subsistemas da vida individual e social. Estudos nessa área ajudam na compreensão dos diferentes aspectos socioculturais dos usuários. O presente trabalho objetiva-se por caracterizar o perfil dos usuários de álcool e cigarro atendidos na unidade de saúde da família Jardim Monte Verde-PE. A fim de realizar uma caracterização do perfil dos participantes, foi realizado um estudo descritivo de abordagem quantitativo, nas USF Jardim Monte Verde. A amostra foi realizada com 50 sujeitos (sendo 25 usuários de cigarro e 25 usuários de álcool), na faixa etária de 18 a 60 anos de ambos os gêneros, a coleta de dados foi realizada através de entrevista semiestruturada, e análise de os prontuários. Os resultados obtidos pela escala com algumas variáveis relacionadas com o hábito tabágico e etilista e com a própria auto avaliação da , detectou os principais aspectos psicossociais referentes ao consumo de cigarros e álcool. Considera-se a produção dos conhecimentos referente ao perfil dos usuários de álcool e cigarro, reflete sobre ações e o processo de trabalho que envolve o tema do uso dos mesmos na atenção primária. Entendemos também que esse estudo poderá servir de base para futuras pesquisas relacionadas ao tema e que contribuirá para uma melhor compreensão do perfil atual dos usuários de cigarro e/ou álcool da atenção básica do município. Assim como, fonte de dados singular para fomentar as políticas de saúde preventivas, bem como ser entregue aos poderes legislativo e executivo municipal para auxiliar em suas políticas sociais.

**Palavras-chaves:** drogas ilícitas, saúde, atividade física.

**Abstract-** The excessive use of both licit and illicit drugs has shown a great growth during the last years, the use of licit drugs is a complex issue, as it involves several subsystems of individual and social life. Studies in this area help in understanding the different socio-cultural aspects. This study aims to characterize the profile of alcohol and cigarette users seen at the Jardim Monte Verde-PE family health unit. In order to characterize the profile of the participants, a descriptive quantitative approach study was carried out at the USF Jardim Monte Verde. The sample consisted of 50 subjects (25 cigarette users and 25 alcohol users), aged between 18 and

60 years of both genders. Data collection was performed through semi-structured interviews and analysis of medical records. The results obtained by the scale with some variables related to smoking and alcohol consumption and the self-assessment of self detected the main psychosocial aspects related to cigarette and alcohol consumption. The production of knowledge regarding the profile of alcohol and cigarette users is considered, reflecting on actions and the work process that involves the theme of their use in primary care. We also understand that this study could serve as a basis for future research related to the theme and will contribute to a better understanding of the current profile of cigarette and/or alcohol users of primary care in the municipality. As well as a unique data source to foster preventive health policies, as well as being handed over to the municipal legislative and executive powers to assist in their social policies.

**Keywords:** illicit drugs, health, physical activity.

## 1. INTRODUÇÃO

O uso demasiado de drogas, tanto lícitas quanto ilícitas, apresentou um grande crescimento durante os últimos anos, o consumo declarado de drogas ilícitas ao menos uma vez na vida passou de 19,4% em 2009 para 22,8% em 2010<sup>1</sup> e, dessa forma, intensifica-se a preocupação com os problemas na saúde pública mundial. O consumo de drogas gera diversos fatores que impactam direta ou indiretamente a sociedade, causando, na maioria das vezes, inúmeros prejuízos para o coletivo<sup>2</sup>. No Brasil e no mundo às características da pós-modernidade refletiram transformações no modo de pensar e agir das pessoas, sobretudo, no que diz respeito ao comportamento ao uso de álcool e cigarro<sup>1</sup>. Deste modo, o aumento do número de usuários de drogas, com suas repercussões sociais, físicas, biológicas e psicológicas no indivíduo e nos meios familiar e social constituem-se num grave problema de saúde pública<sup>3</sup>.

A OMS (2008)<sup>1</sup> considera como uso abusivo de bebidas o consumo de mais de 6 doses em uma única ocasião (60 gramas ou mais de álcool puro), pelo menos uma vez por mês. Muitos estudos<sup>4</sup> buscam identificar características que predispõe um indivíduo a um maior risco de desenvolver abuso ou dependência.

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Em relação ao álcool, por exemplo, estima-se que os fatores genéticos expliquem cerca de 50% das vulnerabilidades que levam o indivíduo a fazer uso pesado de álcool - principalmente genes que estariam envolvidos no metabolismo do álcool<sup>5</sup>. A maioria das pessoas não sabe que o alcoolismo é uma doença<sup>3</sup>. Existe muito preconceito e ele é originado da desinformação por acharem que a pessoa que tem problema com a bebida alcoólica é por falta de caráter, de vergonha na cara, e outras expressões pejorativas que acabam utilizando.

Assim como o uso abusivo de álcool tabagismo é considerado um problema de saúde pública, considerando a Organização Mundial da Saúde (OMS, 2010)<sup>6</sup>, durante o século XX o tabagismo matou 100 milhões de pessoas e durante o século XXI poderá matar um bilhão de pessoas no mundo inteiro. O relatório mostra ainda que dois terços da população mundial de fumantes habitam em dez países e o Brasil figura entre estes, ocupando a sétima colocação (OMS, 2010)<sup>6</sup>. Aponta também que ocorrem cerca de 5,4 milhões de mortes anualmente em consequência do tabagismo e, por essa razão, agir de forma a reverter a epidemia deve ser a prioridade máxima para a saúde pública e dos líderes políticos de cada país do planeta. Os efeitos do *status* socioeconômico do país, nível socioeconômico e a mobilidade social influenciam no desenvolvimento do hábito de fumar desde a adolescência até a idade adulta. Isso porque o mais baixo nível de instrução por parte dos pais representa significativo fator de risco para o tabagismo nos filhos<sup>5</sup>.

O uso de drogas lícitas é uma questão complexa de múltiplas dimensões, pois envolve vários subsistemas da vida individual e social. A vida do usuário e de sua família se torna complexa, devido as consequências que o uso de álcool e cigarro traz para todos<sup>7</sup>. Estudos nessa área ajudam na compreensão dos diferentes aspectos socioculturais dos usuários.

Ao se compreender a problemática atual do uso do cigarro e do álcool busca-se, com esse estudo, caracterizar o perfil dos usuários de álcool e cigarro atendidos na unidade de saúde da família Jardim Monte Verde-PE.

## II. METODOLOGIA

A pesquisa foi realizada na Unidade de Saúde da Família (USF) Jardim Monte Verde (JMV), localizadas na Regional II do Município de Jaboatão dos Guararapes – PE. A unidade é descoberta pelos Núcleos de Apoio à Saúde da Família (NASF), mas recebe atenção dos Residentes multiprofissionais das áreas de: Educação Física, Terapia Ocupacional, Fisioterapia, Nutrição, Enfermagem, Psicologia, Serviço Social, Farmácia, Odontologia e Fonoaudiologia. Após parecer 3.557.410 do comitê de ética da Universidade Estadual da Paraíba (UEPB, 2019), a amostral foi

realizada por conveniência, com 50 sujeitos (sendo 25 usuários de cigarro e 25 usuários de álcool), na faixa etária de 18 a 60 anos de ambos os gêneros e que foram cadastrados e em atendimento na unidade de saúde JMV. A pesquisa realizou-se no período de Agosto a Outubro de 2019. A coleta de dados foi realizada através de entrevista semiestruturada, composta por questões respondidas individualmente por cada usuário. Primeiramente ocorreu a seleção da amostra que foi por conveniência, incluindo os prontuários que contemplassem todas as variáveis elencadas no instrumento. Após a análise dos prontuários, ocorreu uma conversa com os Agentes Comunitários de Saúde de cada micro áreas, a fim de coletar mais dados e selecionar os possíveis entrevistados. Os usuários responderam a um questionário baseado nas recomendações da Federação Nacional das CAPS (Noal, Passos & Freitas 2020, p 19)<sup>21</sup> no questionário de Avaliação de Dependência de Nicotina (INCA, 2012), como objetivo obter informações estreitamente relacionadas ao contexto psicológico e social voltado ao consumo de álcool e cigarro (sexo, idade, escolaridade, situação de moradia, entre outros). Os questionários foram aplicados pela pesquisadora responsável, na USF Jardim Monte Verde ou através de visitas domiciliares. Os resultados foram tabulados no programa Microsoft Excel 2010.

## III. RESULTADOS E DISCUSSÃO

Esta pesquisa começa por seguir de perto as várias áreas do questionário, e análise dos prontuários apresentando as estatísticas descritivas correspondentes a cada pergunta.

A tabela 1 dispõe sobre a caracterização sociodemográfica dos usuários de álcool e/ou cigarro da Unidade de Saúde a Família Jardim Monte Verde - PE, no que se referem às variáveis sexos, faixa etária, raça/cor, estado civil e escolaridade.



**Tabela 1:** Distribuição sociodemográfica dos usuários de álcool e/ou drogas USF JMV-PE

[illegible]

Os principais dados em relação ao consumo de álcool e de tabaco relativos ao bloco das variáveis demográficas e socioeconômicas foram os apresentados pelo sexo masculino. Andrade, Sena, Pinheiro & Meira (2013)<sup>8</sup>, em seus estudos sobre a população Brasileira, verificou uma maior prevalência de alcoolistas e tabagistas em indivíduos do sexo masculino. A idade dos usuários variou entre 18 e 60 anos. O maior número de usuários foi observado na faixa etária dos 25 aos 55 anos de idade. Entre os usuários com mais de 60 anos, havia 04 com mais de 70 anos de idade usuários de cigarro. Com o avançar da idade o percentual de fumantes diminui<sup>9</sup>. O uso do tabaco associa-se à piora do estado de saúde e qualidade de vida, além de ser um fator de risco para a mortalidade prematura e as incapacidades cardiovasculares<sup>10</sup>. Em relação ao consumo de álcool 80,45% dos homens consomem bebidas alcoólicas em uso abusivo. Bortoluzzi (2010, p. 32)<sup>11</sup> em seus verificou que existe uma maior prevalência de consumo mensal entre pessoas mais jovens e predominantemente do sexo masculino.

Sobre a procura a USF Jardim Monte Verde, 30% dos usuários afirma nunca terem indo à unidade e apenas 17,4% frequentam a unidade a mais de cinco a dez anos. Sobre a raça/cor, foi verificada uma maior porcentagem de usuários pardos (60%). No que tange ao estado civil, são mais frequentes os usuários solteiros ou em união estável. Para a variável escolaridade, 5% dos usuários do sexo masculino declararam não ter nenhum nível de instrução escolar. Os dados relatados no estudo de Laranjeiras (2008, p. 22)<sup>12</sup> demonstram que na Região do Recife há um maior consumo de álcool e cigarro por parte dos usuários de menores condições sociais e menor grau de escolaridade.

Com relação à religião a maioria (35%) se define católico, e 28,9% se declararam evangélicos enquanto 12,0% se declararam ateus. Segundo Zanatta (2012, p. 45)<sup>13</sup> à religião é um importante aspecto que deve ser levado em consideração nas diversas terapias usadas no tratamento da dependência química. No que concerne à renda familiar dos usuários, verificou-se que 41,8% vivem com a importância de até um salário mínimo. Dados de pesquisas internacionais<sup>14</sup> associam o baixo nível econômico, acumulação de muitos fatores negativos, com a maior proximidade com o uso de álcool e cigarro.

Ao analisar-se a questão do trabalho, foi verificado que 47,3 % usuários do estavam trabalhando fixo, (28,7%) estavam desempregados. Entre os indivíduos que recebiam algum tipo de benefício social destacam-se que, 40% recebiam benefício do Programa Bolsa, 15% Benefício de Prestação Continuada, 20% são aposentados e 25% não recebe

nenhum benefício. Lima & Loyola (2008, p.23)<sup>15</sup> em suas pesquisas sobre as características sócias econômicas de usuários atendidos em um centro de atenção psicossocial de Recife, obteve dados semelhantes ao obtidos no presente estudo. Quanto à situação de Moradia 50% possuem casa própria e 35% morram em casas alugadas, 15% vivem em situação de rua. Destes 40% moram na casa com sua (o) esposa/ marido, 22% com os pais, 19% com seus filhos e 18% morram sozinho. Em sua maioria (33%) dos usuários moram com 4 pessoas da família.

Na tabela dois estão retratados os fatores relacionados ao conhecimento dos usuários em relação ao conhecimento e disponibilidade dos tratamentos de álcool e drogas, assim como aspectos relativos à saúde e melhoria de sua qualidade de vida.

Tabela 2: Fatores relacionados à disponibilidade de tratamento de saúde

Conhecem os serviços do CAPS		Já esteve no CAPS		Já esteve em situação de rua	
Álcool25%	Cigarro42%	sim30%	não 70%	Sim20%	não 80%
Famíliares que fazem uso de cigarro e /ou álcool					
Álcool 58% cigarro 42%					
Pratica exercício físico					
Álcool - caminhada 25%		cigarro - caminhada 60%	ciclismo 10%	dança 15%	
Ao praticar exercício físico sente-se melhor					
Álcool 20%		cigarro 80%			
Motivo de não se exercita					
Desinformação 30%		falta de área de lazer 60%	falta de apoio da família 20%		
sedentarismo 28,6%		episódios de embriaguez 32%	falta de campanha 17%		
Participariam de um grupo de atividade física na USF JMV					
Sim 78,9%		não21,1%			

Fonte: dados pessoais das entrevistas, 2018

Os resultados obtidos demonstram que 25% dos usuários de álcool e 42% dos usuários de cigarro tem conhecimento sobre a atuação do Centro de Atenção Psicossocial (CAPS), na estratégia de prevenção e tratamento ao álcool e outras drogas e que ao se referirem a CAPS acreditam que seja para “tratamento de doidos”. Destes apenas 30% havia passado alguma vez pelo CAPS, afirmando que o motivo da procura pelo mesmo foi por ansiedade, nervosismo, agitação, agressividade, ou tremores pela abstinência. Os Dados demonstraram que a população principalmente a elitista ainda precisa ser informada sobre os tratamento e terapias oferecidas no CAPSad, visto que muitos ainda demonstram um certo preconceito em procurar por tratamento e muitas vezes nem sabem como atua o CAPS.

Devido à dependência etílica, 20% dos usuários de álcool se encontram vivendo nas ruas, esses usuários se encontram na faixa dos 40 anos e devido ao vício vivem sozinhos ou abandonaram famílias. Uma pesquisa nacional, realizada em 2008, a pedido do Ministério do Desenvolvimento Social e Combate à Fome (MDS)<sup>16</sup>, traçou um perfil da população em situação de rua. De acordo com o estudo, realizado em 71 municípios nas instituições e na rua, a população em situação de rua é predominantemente masculina (82%); entre as principais razões da ida para a rua são o alcoolismo ou o uso de drogas (35,5%); o desemprego (29,8%) e desavenças com pai, mãe ou irmãos (29,1%).

No que se refere aos familiares fazerem consumo de álcool ou cigarro, 58% dos familiares consomem algum tipo de bebida socialmente e 40% possuem algum familiar que fuma cigarro. O alto índice do consumo de bebidas deve-se ao fato da bebida ser aceita socialmente, além da mídia massificar nos programas de Tv o ato de beber como forma de se divertir. Já a proporção de fumantes na população brasileira caiu entre homens e mulheres de 1990 a 2015, passando de 29% para 12,6% entre eles e 18,6% para 8,2% entre elas.<sup>17</sup>

No tocante a prática de atividade física as maiores das etilistas são sedentários, apenas 25% pratica caminhadas, enquanto que entre os tabagistas, 60% praticam caminhada, 10% Ciclismo e Dança 15%, desses 80% dos praticantes sentem-se melhor ao praticar exercícios físicos. A prática esportiva é altamente recomendada para ex-fumantes e ex-etilistas, ela inclusive funciona como um ótimo apoio para lidar com a ansiedade natural das primeiras semanas sem cigarro e sem álcool. Segundo Fraga, Mazo, Stigger & Goellner (2009, p.32)<sup>18</sup> o exercício físico ajuda a tirar o foco do tabagista do cigarro, sobretudo naquele período em que ele está empenhado em reduzir ou controlar a vontade de fumar. Existem evidências<sup>19</sup> que a atividade física pode atenuar os efeitos do álcool à medida que as mitocôndrias,

aumentam sua capacidade de metabolizar o álcool em pessoas que praticavam exercícios, assim como proporciona o aumento da autoestima e dos neurotransmissores de serotonina.

Contudo muitos usuários se queixaram que a falta de informação a respeito dos benefícios da atividade física e a falta de apoio da família levam esses usuários a não praticarem atividade física. Além da falta de profissionais Educadores físicos nos programas de atenção primária no tratamento de álcool e drogas e a falta de investimento público em áreas de lazer, especialmente no tocante a região de Jardim Monte Verde-Jaboatão dos Guararapes - PE, dificultam o acesso as praticas de lazer e esporte a toda a comunidade em especial aos etilistas e tabagistas. Que acabam se prejudicando ao serem privados das atividades físicas cotidianas.

No que concerne a participar de um grupo de exercícios físicos da USF Jardim Monte Verde, 80% dos usuários adoraram a ideia de poderem realizar atividades como alongamentos, caminhadas e exercícios na unidade de saúde. Além de poderem fazer amizades e dividirem experiências entre os participantes, possibilitando assim uma melhoria da socialização.

Sendo as UBS acessíveis a todos os cidadãos n a promoção da atividade física nestes locais é essencial. Sendo intervenções na sala de espera, os grupos de atividade física orientada e o atendimento ambulatorial, importantes ferramentas para apoiar as ações dos médicos, enfermeiros e demais profissionais da UBS.

Em relação a se sentirem melhor ao praticar exercícios, 35% dos usuários de álcool afirmaram se sentirem melhor entre os tabagistas esse porcentagem foi de 85%. Entre os motivos para não praticarem atividade física destacou-se os episódios de usuários embriagados 32% e o sedentarismo 28,6%, sabe-se que o álcool acaba tornando o individuo debilitado, ocasionando com que ele não tenha animo para a atividade física.

Os exercícios físicos contra o alcoolismo o tabagismo têm se mostrado como fator primordial no tratamento e também no processo de recuperação do dependente.

Tanto o álcool como o cigarro são drogas capazes de alterar a fisiologia de todo o organismo, provocando assim um desequilíbrio no corpo. A atividade física é uma forma de lazer e de restaurar a saúde dos efeitos estressantes, depois de superado o período inicial 20. A prática do exercício reduz a ansiedade, a percepção de esforço e aumenta o prazer, podendo, esse prazer e ansiedade que antes eram encontrados na bebida e/ou no cigarro agora serem encontrados na atividade física.



Quanto a participação em um grupo de exercícios físicos da USF Jardim Monte Verde 78,9% se sentiram vontade dispostos a participarem de grupos de atividades físicas na unidade. Tem-se conhecimento de que praticar atividade física ajuda na melhora da qualidade de vida do indivíduo, pois além de proporcionar ganhos fisiológicos também contribui para o seu bem estar mental.

“A atividade física faz com que o organismo adapte-se a um patamar maior de exigência e de capacidade de resposta. Se observarmos as pessoas em tratamento para dependência química, existe um processo contínuo desde a fase inicial, que se caracteriza pela limitação, pela perda progressiva da capacidade de adaptar-se, de responder a uma sobrecarga física ou mental, seja do cotidiano, seja uma sobrecarga artificial ou incomum, como sua exposição a doenças provenientes do uso de substâncias psicoativas. Ela varia de intensidade e duração respeitando a individualidade biológica de cada indivíduo, causando-lhes um estado de relaxamento tanto psíquico quanto somático” (Roeder, 1999, p. 35).

Assim exercício durante a exposição à nicotina e ao álcool reduz acentuadamente a gravidade dos sintomas de abstinência desta substância, os achados apoiam o efeito protetor do exercício contra o desenvolvimento da dependência física, o que pode ajudar a parar de fumar e beber reduzindo a gravidade dos sintomas de abstinência, sendo assim de suma importância que os usuários queremparticipar das atividades físicas oferecidas na Unidade de Saúde Jardim Monte Verde.

O presente trabalho evidencia-se por contribuir na elaboração informes referente ao perfil dos usuários de álcool e cigarro, ponderando sobre ações e o processo de trabalho que envolve o tema do uso dos mesmos na atenção primária. Pretendendo como cunho social contribuirna melhoria da percepção da temática na atenção básica do Município de Jaboatão dos Guararapes, tendo a possível cooperação para a construção da identidade dos usuários assim como, ilustrar os fatores pressupostos ao trabalho dos profissionais de saúde implícitos nos serviços de saúde. Ademais esse estudo servira de base para futuras pesquisas relacionadas a temática e contribuirá para uma melhor compreensão do perfil atual dos usuários dos etilistas e tabagistas da atenção básica do município. Bem como, fonte de dados representativos para assessorar as políticas de saúde preventivas, assim como serem entregues aos poderes legislativo e executivo municipal para auxiliar em suas políticas sociais .

## REFERENCES RÉFÉRENCES REFERENCIAS

1. Andolfatto I., Frighetto D., Winck D.R., Bibiana Paula Dambrós B.P. (2016). *Caracterização de usuários de álcool e drogas atendidos pelo centro de atenção psicossocial (CAPS-i) de um município do meio oeste Catarinense*. Unoesc & Ciência - ACBS Joaçaba, v. 7, n. 1, p. 31-38, jan./jun.
2. Zanatta, Aline Bedinet al. (2012). O Centro de Atenção Psicossocial álcool e drogas sob a percepção do usuário. *Revista Baiana de Saúde Pública*, Salvador, v. 36, n. 1, p. 225-237, jan./mar.
3. Baltieri, da. Opióides: aspectos gerais. In: Focchi GRA, Leite MC, Laranjeira R, Andrade AG. *Dependência química: novos modelos de tratamento*. São Paulo: Roca; 2001. p. 109-16.
4. Freitas, Aline Araujo; Souza, Rozemere Cardoso. (2010). Caracterização clínica e sociodemográfica dos usuários de um Centro de Atenção Psicossocial (CAPS). *Revista Baiana de Saúde Pública*, Salvador, v. 34, n. 3, p. 530-543, jul./set. Disponível em: Acesso em: 02 fev. 2016.
5. Passagli, Marcos. (2011). *Toxicologia forense: teoria e prática*. 3. ed. Campinas: Millenium.
6. Organização Mundial da Saúde. *Tabagismo e saúde nos países em desenvolvimento*; tradução. Brasília: Instituto Nacional do Câncer; 2003. [Citado 2010 maio 4]. Disponível em: [http://www.inca.gov.br/tabagismo/frameset.asp?item=publicacoes&link=tabagismo\\_saude.pdf](http://www.inca.gov.br/tabagismo/frameset.asp?item=publicacoes&link=tabagismo_saude.pdf)
7. Moreira, M. R.; Ribeiro, J. M.; Ouverney, A. M. (2017). Obstáculos políticos à regionalização do SUS: percepções dos secretários municipais de saúde com assento nas comissões intergestoresbipartites. *Ciência & Saúde Coletiva, Rio de Janeiro*, v. 22, n. 4, p. 1097-1108.
8. Andrade LM, Sena ELS, Pinheiro GML, Meira EC, Lira LSSP. Public policies for the elderly in Brazil: an integrative review. *Ciênc Saúde Coletiva*. 2013;18 (12): 3543-52. [ Links ]
9. Rabello, LS. (2010). *Promoção da saúde: a construção social de um conceito em perspectiva do SUS*. Rio de Janeiro: Editora FIOCRUZ, 2010. 228 p. ISBN: 978-85-7541-352-4. Available from SciELOBooks .
10. Brasil. Ministério da Saúde (MS). (2011). *Secretaria de Vigilância em Saúde. Secretaria de Gestão Estratégica e Participativa. Vigilatel Brasil: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico*. Apresentação Vigilatel.
11. Marcelo Carlos Bortoluzzi<sup>II</sup>; Jefferson Traeber<sup>III</sup>; Alessandro Loguerici<sup>III</sup>; Ruth Terezinha Kehrig<sup>IV</sup> (2010). Prevalência e perfil dos usuários de álcool de população adulta em cidade do sul do Brasil. *Ciênc. saúde coletiva vol.15 no.3* Rio de Janeiro

May. <http://dx.doi.org/10.1590/S1413-81232010000300010>.

12. Laranjeira R, Pinsky I, Zaleski M, Caetano R. / *Levantamento Nacional sobre os padrões de consumo de álcool na população brasileira*. [site da Internet]. [acessado 2008 out]. Disponível em: <http://www.obid.senad.gov.br> [ Links ]
13. Zanatta, A. B., Garghetti F. C. Lucca, S. R. (2012). O Centro de Atenção Psicossocial Álcool e Drogas sob a percepção do usuário. *Revista Baiana de Saúde Pública*, v.36, n.1, p.225-237 jan./mar.
14. Rodrigues, L.S.A., Sena, E.L.S., Silva, D.M. da et al. (2013). Perfil dos usuários atendidos em um Centro de Atenção Psicossocial – Álcool e drogas. *Revenferm UFPE online.*, Recife, 7(8): 5191-7, ago. DOI: 10.5205/reuol.3452-28790-4-ED.0708201316.
15. Lima-Costa MF, Loyola Filho AI, Matos D. Tendências nas condições de saúde e uso de serviços de saúde entre idosos brasileiros: um estudo baseado na Pesquisa Nacional por Amostra de Domicílios (1998, 2003). *CadSaude Publica* 2007; 23 (10): 2467-2478. [Links]
16. Brasil. (2009). Secretaria Nacional de Políticas sobre Drogas (SENAD). *Relatório brasileiro sobre drogas*. Brasília: SENAD.
17. Ec, Medeiros , A.T, Trajano, F.M.P, Chaves Neto, G; Almeida, S. A; Almeida, L. R. (2017). *O cuidado em saúde mental no território: concepções de profissionais da atenção básica*. Escola Anna Nery 21(3).
18. Políticas de lazer e saúde em espaços urbanos/ organização Alex Branco Fraga, Janice Zarpellon Mazo, Marco Paulo Stigger, Silvana Vilodre Goellner – Porto Alegre: Gênese, 2009. p32 – (Série Esporte, Lazer e Saúde)
19. Oliveira AF, Valente JG, Leite IC. Aspectos da mortalidade atribuível ao tabaco: revisão sistemática. *Rev Saúde Pública*. 2008; 42(2): 335-45.
20. Barbosa, Pereira, Cruz, Leite . Prevalência e fatores associados ao consumo de álcool e de tabaco em idosos não institucionalizados. *Rev. bras. geriatr. gerontol.* vol.21 no.2 Rio de Janeiro abr./mar.2018 <http://dx.doi.org/10.1590/1981-22562018021.170185>.
21. Débora da Silva Noal, Maria Fabiana Damasio Passos e Carlos Machado de Freitas. (2020). *Recomendações e orientações em saúde mental e atenção psicossocial na COVID-19* - Rio de Janeiro: Fiocruz, 342 p.





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## Rural Development with Agroecological Emphasis for Highly Marginalized Areas in Mexico: The Bet for the Paradigm Change

By Dr. Pedro Cadena Iñiguez, Dr. Rafael Ariza Flores, Dr. Mariano Morales Guerra,  
M.C. Rafael F. Rodríguez Hernández & Dr. José Gabriel Berdugo Rejón

**Abstract-** For four years the Production for Well-being Program has been developed, which consists of three axes of operation: direct support to producers, marketing and technical support in 11 production chains in 27 states of the Mexican Republic, with more or less than 600 municipalities of high marginalization, the accompaniment is implemented by the National Institute of Forestry, Agriculture and Livestock Research, (INIFAP), the central objective of the program is: food self-sufficiency through the agroecological transition, the results indicate that at least in the In the first three years, agroecological work practices, plant nutrition and soil bioremediation have been adopted through the production of local bio-inputs by the producers, in addition to the rescue and conservation of native resources, mainly corn, as well as a holistic vision of management of the Rural Production Unit (UPF). The program places special emphasis not only on the promotion of agroecological practices but also on inclusion and gender equity, as evidenced by the 34% participation of women.

**Keywords:** food self-sufficiency, marginalized areas, agroecology.

**GJHSS-H Classification:** LCC: HD1415



RURAL DEVELOPMENT WITH AGROECOLOGICAL EMPHASIS FOR HIGHLY MARGINALIZED AREAS IN MEXICO: THE BET FOR THE PARADIGM CHANGE

*Strictly as per the compliance and regulations of:*



# Rural Development with Agroecological Emphasis for Highly Marginalized Areas in Mexico: The Bet for the Paradigm Change

Dr. Pedro Cadena Iñiguez <sup>α</sup>, Dr. Rafael Ariza Flores <sup>ο</sup>, Dr. Mariano Morales Guerra <sup>ρ</sup>,  
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**Resumen-** Desde hace cuatro años se desarrolla el Programa Producción para el Bienestar, el cual consta de tres ejes de operación: apoyo directo a los productores, comercialización y acompañamiento técnico en 11 cadenas productivas en 27 estados de la República Mexicana, con más o menos de 600 municipios de alta marginación, el acompañamiento es implementado por el Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, (INIFAP), el objetivo central del programa es: la autosuficiencia alimentaria a través de la transición agroecológica, los resultados indican que al menos en los primeros tres años se han adoptado prácticas de trabajo agroecológica, nutrición vegetal y biorremediación de suelos mediante la elaboración de bioinsumos locales por parte de los productores, además del rescate y conservación de los recursos nativos, principalmente el maíz, así como una visión holística de gestión de la Unidad de Producción Rural (UPF). El programa pone especial énfasis no sólo en la promoción de prácticas agroecológicas sino también la inclusión y la equidad de género, la prueba es el 34% de participación de mujeres.

**Palabras clave:** autosuficiencia alimentaria, zonas marginadas, agroecología.

**Abstract-** For four years the Production for Well-being Program has been developed, which consists of three axes of operation: direct support to producers, marketing and technical support in 11 production chains in 27 states of the Mexican Republic, with more or less than 600 municipalities of high marginalization, the accompaniment is implemented by the National Institute of Forestry, Agriculture and Livestock Research, (INIFAP), the central objective of the program is: food self-sufficiency through the agroecological transition, the results indicate that at least in the In the first three years, agroecological work practices, plant nutrition and soil

bioremediation have been adopted through the production of local bio-inputs by the producers, in addition to the rescue and conservation of native resources, mainly corn, as well as a holistic vision of management of the Rural Production Unit (UPF). The program places special emphasis not only on the promotion of agroecological practices but also on inclusion and gender equity, as evidenced by the 34% participation of women.

**Keywords:** food self-sufficiency, marginalized areas, agroecology.

**Resumo-** Há quatro anos desenvolve o Programa Produção para o Bem-estar, que consiste em três eixos de atuação: apoio direto aos produtores, comercialização e apoio técnico em 11 cadeias produtivas em 27 estados da República Mexicana, com mais ou menos de 600 municípios de alta marginalização, o acompanhamento é implementado pelo Instituto Nacional de Pesquisa Florestal, Agropecuária, (INIFAP), o objetivo central do programa é: autossuficiência alimentar através da transição agroecológica, os resultados indicam que pelo menos no Nos primeiros três anos, foram adotadas práticas de trabalho agroecológico, nutrição vegetal e biorremediação do solo por meio da produção de bioinsumos locais pelos produtores, além do resgate e conservação dos recursos nativos, principalmente o milho, além de uma visão holística de gestão da Unidade de Produção Rural (UPF). O programa dá ênfase especial não apenas à promoção de práticas agroecológicas, mas também à inclusão e à equidade de gênero, evidenciada pela participação de 34% de mulheres.

**Palavras-chave:** autossuficiência alimentar, áreas marginalizadas, agroecologia.

## I. INTRODUCTION

Mexico and the world face in addition to the pandemic caused by COVID-19; the armed conflicts that occurred between Russia and Ukraine in 2022, which have unleashed a problem of global shortage of food or inputs for agricultural production, even with these restrictions, food production and the work of producers in the field it has been maintained and the problem has not been greater globally. In Mexico, to support this fundamental sector, the federal government promoted the Production for Well-being program as a strategic program, with the consideration of including the producers of the following productive chains: corn/milpa, *Zea mays* L; bean, *Phaseolus vulgaris* L; bread wheat, *Triticum aestivum*;

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rice, *Oryza sativa*; amaranth, *Amaranthus hypochondriacus*; chia, *Salvia hispanica*; cacao, *Theobroma cacao*; sugar cane *Saccharum officinarum*; y, coffee, *Coffea arabica*; milk from *Bos* spp and honey produced by *Apis mellifera* and *Melipona beecheii*. The priority of this program is to contribute to the strategy to achieve food self-sufficiency, as well as the rescue of the countryside, prioritizing the most marginalized sectors of the United Mexican States. In relation to the above, since 2020 and to date, the bases for collaboration between the Ministry of Agriculture and Rural Development were established, through the Sub-secretariat for Food Self-Sufficiency and the General Direction of Organization for Productivity and the National Research Institute Forestry, Agriculture and Livestock (INIFAP) to combine actions and resources for training strategies and/or technical-organizational support, aimed at the Production Program for Well-being, facilitating the adoption of agroecological and sustainable practices and increasing their yields, as well as to strengthen the implementation of productive linkage services and the articulation of public policies, by small and medium-scale producers in the selected territories, to increase sustainable production. The country was divided into 35 territories located in 27 states of Mexico. The Technical Accompaniment Strategy (EAT) consists of six main axes: Training and qualification, organization and territory, agroecological transition, public policy, agrobiodiversity and commercialization.

In the intellectual and academic development for the construction of the agroecological paradigm, there have been a series of events and global meetings that have resulted in different development models, until the contemporary agroecological concept has been coined, among them at least five models can be highlighted to cite the following. less:

a) Conservation model, b) The model of highly profitable inputs, c) The model of diffusion of innovations, d) Sustainable development and e) Human development.

#### a) *Conservation model*

Paradoxically, the first model of agricultural development is the conservationist model, exercised during the 18th to the 19th centuries, associated with the English agricultural revolution and the evidence of land depletion. Activities focused on the preparation and use of organic fertilizers, as well as crop rotation. The model supported the development of Chinese agriculture in the 1950s and 1960s, however, it was outpaced by the demand for food. However, it is a viable model in different contexts. (Eicher and Staatz, 1984).

Model of highly profitable inputs. In the 1960s, a new perspective emerged, based on investment to develop profitable inputs for producers, associated with public and private research institutions to produce new

technical knowledge, the industrial sector to produce new inputs, and the ability to producers to acquire and use new knowledge and inputs. This model had its greatest impact on the production of wheat and rice, benefiting producers in Asia, Africa and America. Also known as the green revolution (Eicher and Staatz, 1984).

#### b) *Diffusion of innovations model*

It refers to the dissemination of more efficient technical knowledge, as well as inputs and equipment to underdeveloped countries. It is mainly associated with extension programs promoting rural development. In general, technical assistance initiatives have not produced the expected results (Stavenhagen, 1981., Sepúlveda, 1981).

#### c) *Sustainable development*

According to Ayelén, 2017, the aspect of conservation and sustainability dates back to the 18th and 19th centuries, with the figures of Charles Linneo, Jean-Baptiste Lamarck, Charles Darwin and Alfred Russel Wallace, among others. Thus, national parks and protected reserves were created that excluded settlements and human activities. England and the United States were pioneers in the formation of associations and laws in defense of nature, an example followed by France, Germany and Spain. The International Union for Conservation of Nature (IUCN), created in 1948, is a membership union made up of states, government agencies, and civil society organizations that seek, in an integrated manner, human progress, economic development, and nature conservation, supporting in the areas of biodiversity and climate change.

In 1968, the United Nations Educational Organization (UNESCO) held the first world meeting between states on the environment, also known as the Biosphere Conference, concluding on the need to achieve a proper use of biosphere resources. compatible with its conservation, as a basis for sustainable development. Subsequently, the First United Nations Conference on the Environment, later called the "Stockholm Earth Summit", is held in Stockholm. From this meeting derived the report of the Brundtland Commission, Our Common Future, published in 1987, introducing the concept of sustainable development. This study modified the patterns of approach and analysis of the environment, which represented a paradigm shift in the conception of development (Ayelén, 2017).

The multiple movements, conferences, commissions and summits of different institutional spheres of the last century have not yet produced all the necessary changes to build a more sustainable society. As stated, social, economic and environmental threats, and their effects, continue to endanger the survival of humanity and other living beings (Rodríguez and Hesse-Rodríguez, 2000, Bunch, 1982; Stavenhagen, 1981).

d) *Human development*

Max - Neef et al, 1986 and López - Calva and Vélez, 2003, coincide in pointing out that the basic postulate of development must be; "Development refers to people and not to objects", and that the best development process or model will be the one that allows people to further increase the quality of life, and that the quality of life will depend on the possibilities they have people to meet their basic human needs. Given this panorama and given the dependence on food and supplies from the primary sector, agriculture, to a large extent, has become a predominantly technical and commercial activity, lacking any comprehensive, holistic and dignifying approach to the human being, promoting the competitiveness and productive efficiency, ignoring the living conditions of producers and their families. Production for the market is promoted, very rarely for food security. (Rodríguez and Hesse-Rodríguez, 2000). In the development approach, the role of industry tends to be more noticeable than that of farmers, who are given a role as a reservoir of resources. (De Janvry, 1975., Rodríguez and Hesse - Rodríguez, 2000).

Human development seeks a direct and participatory practice that reduces the paternalism of the state, in an orientation of search and consensus for creative solutions from the bottom up, and is more consistent with the real aspirations of the people. (Max-Neef, 1986). In 1990, the first report on human development of the United Nations Development Program (UNDP) was published, which tries to place the human being at the center of efforts, far beyond income and economic growth, to cover the needs, potentialities and capacities of people (Ayelén, 2017).

According to UNDP 2000, development is the process of expanding people's options, increasing functions and human capacity. In this way, human development also reflects the results of those functions and capacities as they relate to human beings (López - Calva and Vélez, 2003).

Given this situation in Mexico, global patterns were followed that did not lead us to sustainable development and equity among the different segments of society, for this reason Article 27 is inscribed in the Magna Carta of the United Mexican States, which obliges the State to promote the conditions for integral rural development, to generate employment and guarantee the well-being of the rural population and their participation in national development, and will promote agricultural activity for the optimal use of the land with inputs, credits, training services and technical assistance. Attention to the rural sector is a priority clearly indicated by the public policy of the State, designed and implemented by the current administration of the Federal Executive, likewise, equal opportunities are essential to promote the country, therefore, it is necessary to increase its productivity.

Therefore, the *Sustainable Rural Development Law* was promulgated to "Correct regional development disparities through differentiated attention to the regions with the greatest lag, through comprehensive State action that promotes their transformation and productive and economic reconversion, with a productive approach to sustainable rural development"; In the same order, in articles 1o. and 6th., sustainable rural development is considered to be of public interest. The actions that the State carries out in rural areas are of a priority nature, under criteria of social equity, gender, integrity, productivity and sustainability.

In the *National Development Plan* (PND) 2019-2024, published in the Official Gazette of the Federation, on July 12, 2019, it is established that its main objective is to achieve the Well-being of the population. Likewise, it establishes three General Axes: I. Politics and Government, II. Social Policy and III. Economy. And it foresees as its guiding principles: "Honesty and honesty"; "No to the rich government with poor people"; "Apart from the law nothing; above the law, no one"; "Economy for well-being"; "The market does not replace the State"; "For the good of all, first the poor"; "Leave no one behind, leave no one out"; "There can be no peace without justice"; "Respect for the rights of others is peace"; "No more migration due to hunger or violence"; "Democracy means the power of the people", and "Ethics, freedom, trust".

Axis III of the aforementioned PND establishes Food Self-Sufficiency and Rural Rescue as one of its strategies, in order to achieve self-sufficiency in the basic foods consumed by the population, as well as most of the inputs, machinery, equipment and fuels for agriculture, the foregoing, with sustainability, equity, well-being and respect for the rights of ejidatarios, community members, small owners and indigenous peoples. As well as reaching self-sufficiency in corn and beans and three years later, in rice, beef, pork, poultry and eggs; milk imports will have decreased considerably, agricultural production in general will have reached historical levels and the sector's trade balance will no longer be in deficit.

The 2020-2024 *Agriculture and Rural Development Sector Program* establishes that the agri-food policy will lay the foundations to achieve food self-sufficiency and rescue the agricultural and livestock sectors. The sector will consolidate as one of the main motors of the national economy, as a source of well-being for the people who live in rural territories and as a promoter of a transition towards productive systems that consider the protection and conservation of resources for generations future. He points out that food self-sufficiency must be seen in three dimensions: producing the food that is consumed; generate the inputs and elements required for food production, and develop the necessary knowledge to increase production and effectively respond to the food needs of the current and

future population. It mentions a new productive, fair, healthy, inclusive and sustainable Mexican agri-food system. Three priority objectives are established and linked to the Production for Well-being Program, namely: 1. Achieve food self-sufficiency through increased production and productivity agriculture and aquaculture-fishery; 2. Contribute to the well-being of the rural population by including producers historically excluded in rural and coastal productive activities, taking advantage of the potential of local territories and markets; and, 3. Increase sustainable production practices in the agricultural sector in the face of agroclimatic risks. As well as meeting Mexico's commitment in the Paris Agreement on Climate Change (COP21; December 2016), they highlight the protection of forests and the use of good agricultural practices; committed to achieving by the period 2020-2030.

The *United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas*, states that "Peasants have the right to food sovereignty, to healthy and culturally appropriate food, produced by ecologically sound and sustainable methods, and the right to define their own food and agriculture systems." It states that "peasants have the right to drinking water, sanitation, [...] to "live a healthy life and not be affected by the contamination of agrochemical products such as pesticides and chemical fertilizers."

The *Agreement on Biological Diversity*, locates its intervention facing three main objectives: the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits derived from the use of genetic resources. . It is established that, in accordance with the corresponding national legislation, "it will respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities that embody traditional lifestyles relevant to the conservation and sustainable use of diversity." biologics and will promote its wider application..."

The Agreement by which the Operating Rules of the Production for Well-being Program of the Ministry of Agriculture and Rural Development for the fiscal year 2021 are disclosed, published in the Official Gazette of the Federation of Mexico (DOF) on the 28th of December 2020.

Said "PROGRAM" is part of the programs undertaken by the Federal Government to achieve food self-sufficiency and the rescue of the countryside, as established in the National Development Plan 2019-2024, and that the general objective is to increase the production and productivity of grains (corn, beans, bread wheat and/or rice, among others), amaranth, chia, sugar cane, coffee, cocoa, honey and milk, from small and medium-scale producers. The specific objective refers to providing liquidity to small and medium-scale producers of grains (corn, beans, bread wheat and/or

rice, among others), amaranth or chia, sugar cane, coffee, cocoa and honey, through support direct for their investment in productive activities. With surfaces of up to 20 hectares in rainfed land and up to five hectares under irrigation, in accordance with the provisions of article 8 of the "RULES". Therefore, their strategies were established.

Chapter II. Of the Focused Strategies for Inducing Productivity, the "RULES" indicates that the Responsible Unit is empowered to issue criteria to implement focused strategies for inducing productivity through the training aspect and/or technical-organizational accompaniment directed to the Target Population of the "PROGRAM" to facilitate the adoption of agroecological and sustainable practices and increase their yields, as well as strengthen the implementation of productive linkage services.

The "RULES" establish that the training strategies and/or technical-organizational support are aimed at the Target Population of the Program, to facilitate the adoption of agroecological and sustainable practices and increase their yields, as well as to strengthen the implementation of services of productive linkage.

## II. BACKGROUND AND PUBLIC REGULATIONS

Article 27, section XX, of the Political Constitution of the United Mexican States, establishes that the State will promote the conditions for integral rural development, to generate employment and guarantee the well-being of the rural population and their participation in national development, and It will promote agricultural activity for the optimal use of the land with inputs, credits, training services and technical assistance. Attention to the rural sector is a priority clearly indicated by the public policy of the State, designed and implemented by the current administration of the Federal Executive, likewise equal opportunities is essential to promote the country, so it is necessary to increase its productivity.

The Sustainable Rural Development Law in its article 5, has the objectives "Correct regional development disparities through differentiated attention to the regions with the greatest lag, through an integral action of the State that promotes their transformation and the productive and economic reconversion, with a productive focus of sustainable rural development"; with the same arrangement in articles 10. and 6th, sustainable rural development is considered to be of public interest. The actions that the State carries out in rural areas are a priority, under criteria of social equity, gender, integrity, productivity and sustainability.

In the National Development Plan (PND) 2019-2024, published in the Official Gazette of the Federation (hereinafter DOF), on July 12, 2019, it is established that its main objective is to achieve the Well-being of the

population. Likewise, it establishes three General Axes: I. Politics and Government, II. Social Policy and III. Economy. And it foresees as its guiding principles: "Honesty and honesty"; "No to the rich government with poor people"; "Apart from the law nothing; above the law, no one"; "Economy for well-being"; "The market does not replace the State"; "For the good of all, first the poor"; "Leave no one behind, leave no one out"; "There can be no peace without justice"; "Respect for the rights of others is peace"; "No more migration due to hunger or violence"; "Democracy means the power of the people", and "Ethics, freedom, trust".

Axis III of the aforementioned PND establishes Food Self-Sufficiency and Rural Rescue as one of its strategies, in order to achieve self-sufficiency in the basic foods consumed by the population, as well as most of the inputs, machinery, equipment and fuels. for agriculture. The foregoing is under the aspects of sustainability, equity, well-being and respect for the rights of ejidatarios, community members, small owners and indigenous peoples. As well as, reaching self-sufficiency in corn and beans and three years later, in rice, beef, pork, poultry and eggs; milk imports will have decreased considerably, agricultural production in general will have reached historic levels and the sector's trade balance will no longer be in deficit.

The 2020-2024 Agriculture and Rural Development Sector Program establishes that the agri-food policy will lay the foundations to achieve food self-sufficiency and rescue the agricultural and livestock sectors. The sector will consolidate as one of the main motors of the national economy, as a source of well-being for the people who live in rural territories and as a promoter of a transition towards productive systems, which consider the protection and conservation of resources for the future generations. It is pointed out that food self-sufficiency must be seen in a triple dimension: producing the food that is consumed; generate the inputs and elements required for food production; and, develop the necessary knowledge to increase production and respond effectively to the food needs of the current and future population. He mentions a new productive, fair, healthy, inclusive and sustainable Mexican agri-food system. Three priority objectives are established and linked to the Production for Well-being Program, these are: 1. Achieve food self-sufficiency by increasing agricultural production and productivity and aquaculture-fishery; 2. Contribute to the well-being of the rural population by including producers historically excluded in rural and coastal productive activities, taking advantage of the potential of local territories and markets; and, 3. Increase sustainable production practices in the agricultural sector in the face of agroclimatic risks.

As well as, meeting the commitment of Mexico in the Paris Agreement on Climate Change (COP21; December 2016) highlights the protection of forests and

the use of good agricultural practices; committed to achieve in the 2020-2030 period.

The United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas states that "Peasants have the right to food sovereignty, to healthy and culturally appropriate food, produced using ecologically sound and sustainable methods.", and the right to define their own food and agriculture systems." It states that "peasants have the right to drinking water, sanitation, [...] to "live a healthy life and not be affected by the contamination of agrochemical products such as pesticides and chemical fertilizers."

The Convention on Biological Diversity (CBD) locates its intervention facing three main objectives: the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits derived from the use of genetic resources. In its Article 8, subparagraph j, it establishes that, in accordance with the corresponding national legislation, "it will respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities that involve traditional lifestyles relevant to the conservation and the sustainable use of biological diversity and promote its wider application..."

In the Agreement by which the General Provisions applicable to the Rules and Guidelines for the Operation of the Programs of the Ministry of Agriculture and Rural Development are disclosed, published in the Official Gazette of the Federation on February 4, 2021, article 5, indicate that the Responsible Units are in charge of the operation and execution of the Components that make up the Programs, as established in the various Agreements, by which the Rules of Operation and Guidelines of the Programs of the Ministry of Agriculture and Rural development "MINISTRY".

The Agreement by which the Operating Rules of the Production for Well-being Program of the Ministry of Agriculture and Rural Development for the fiscal year 2021 are disclosed, published in the "DOF" on December 28, 2020, hereinafter referred to as the "RULES", the regulations applicable to the Production Program for Well-being are indicated, hereinafter referred to as the "PROGRAM".

This "PROGRAM" is part of the programs undertaken by the Federal Government to achieve food self-sufficiency and the rescue of the countryside, as established in the National Development Plan 2019-2024, and that the general objective is to increase the production and productivity of grains (corn, beans, bread wheat and/or rice, among others), amaranth, chia, sugar cane, coffee, cocoa, honey and milk, from small and medium-scale producers. The specific objective refers to providing liquidity to small and medium-scale producers of grains (corn, beans, bread wheat and/or rice, among others), amaranth or chia, sugar cane, coffee, cocoa and honey, through support direct for their



investment in productive activities. With surfaces of up to 20 hectares in rainfed land and up to five hectares in irrigation, in accordance with the provisions of article 8 of the "RULES". Therefore, their strategies were established.

Chapter II. Of the Focused Strategies for Inducing Productivity, the "RULES" indicates that the Responsible Unit is empowered to issue criteria to implement focused strategies for inducing productivity through the training aspect and/or technical-organizational accompaniment directed to the Target Population of the "PROGRAM" to facilitate the adoption of agroecological and sustainable practices and increase their yields, as well as strengthen the implementation of productive linkage services.

The "RULES" establish that the training strategies and/or technical-organizational support are aimed at the Target Population of the Program, to facilitate the adoption of agroecological and sustainable practices and increase their yields, as well as strengthen the implementation of health services productive linkage.

### III. AGROECOLOGICAL TRANSITION

The design of agroecological practices is carried out in accordance with the interactions between plants, animals, the environment and human beings, in order to conserve biodiversity, and improve the components of the agroecosystem, as indicated by Altieri and Nicholls (2010).

The agroecological transition defined by Venegas, et al., (2018), define it as the "...process of change in agricultural practices and the biological readaptation of an agricultural system, to achieve balanced results around production, the independence of external inputs, especially agrochemicals, the restoration of all ecological and social processes that allow it to approach sustainability", Reviewing the evolutionary approach of the agroecological transition and Based on an original idea by Stuart Hill, which are taken up by Paddel et al, (2018), and cited by Guadarrama and Trujillo (2019) conclude that: "...the state of the agroecological transition is conceptually stagnant in a permanent process of substitution of chemical inputs for organic inputs." Which, coincides with Venegas, et al., (2018) and Robles, (2016), anticipates these ideas and declares the territory as a larger scale, where the actions and interventions will be developed and not only the Family Production Unit.

The Latin American efforts to make a change in the production paradigms, have to see the changes from individual actions, from groups to social movements, many times with balances that are not very pleasant for those who intervene. In Colombia, the agroecological transition came to the national fore in that country as a need for the agrarian communities,

because they were coming out of a peace agreement between the State and the armed groups, in favor of a change in the productive model at the national level; The change is towards an agroecological model, which is based on the seizure of land and mobilization of producers, which to achieve it is more emanated in the support as a public policy. In Cuba, a more specific study was carried out on a farm, where it was based on the resources identified as natural and human, it was determined that in order to be sustainable and can sustain an average family in rural areas, a larger area is needed for the self-consumption of at least 3 hectares (ha); something similar is planned in Mexico to support producers who normally have 5 hectares, in addition to seeing the Family Production Unit (UPF) as something more holistic and interrelated; For this reason, they suggest establishing areas to replace access to energy for livestock with pastures of the genus *Pennisetum* spp, and sugarcane *Saccharum officinarum*, in addition to obtaining their own organic fertilizers from farm resources (Iglesias et al., 2022). Something similar was found by González, et al., (2022), when carrying out a characterization and measurement of energy flows on a farm and observed that by increasing the biodiversity of the farm, a family of five members can be perfectly fed without external resources; In addition to how profitable UPF can be, the holistic sense of intervention is the richness of the approach in a period of transition. Krainer et al., (2022) found similar results when studying the farms and the possibilities or alternatives, that Ecuadorian producers carry out in their UPF, these are more profitable and sustainable, when they see their resources in an integral way and when the prices are very high costs of external inputs to the farms, the proposal, the elaboration and application based on organic residues is, of imperative necessity; This is a common denominator in South American and Caribbean studies, compared to the Mexican case, which are aimed at low-scale producers or small producers.

A clear strategy to achieve food self-sufficiency is described in Gerbais-Assogba, et al., (2022) in the Republic of Benin, who used organic fertilizers for plant nutrition, caring for the health of animal plants and avoiding the use of pesticides of industrial origin, in addition, the UPF was seen in an integral way; However, among other problems derived from this agroecological approach, the adequate market for their products was found, as well as a low technological support, different from what is happening in Mexico with the Production Program for Well-being (PpB), where the technicians in charge of monitoring are closely linked and rooted in the work areas.

Maldonado and García (2022), indicated in a study in the Sierra de Lobos in the state of Guanajuato, in the center of the country, that the agroecological

transition is more focused by the proximity of population centers and influence more on farming practices. The producers because of their proximity, since they require more innocuous products, as well as making a real change in the production processes; On the other hand, these authors point out that, in other populations, the changes towards an agroecological transition are more linked to the availability of natural resources, such as water and soil fertility. This is a true notion and the need to make a change in the agroecological transition, which is far from the vision that the Ministry of Agriculture currently has.

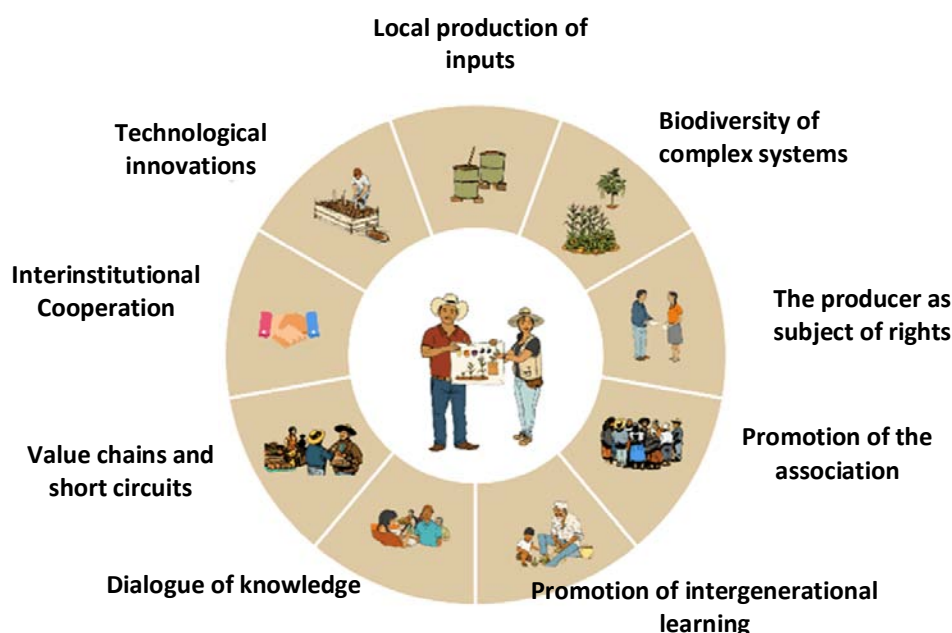
Already in 2010, Altieri and Nicholls, indicated that in the design of agroecological practices they were the product of the interactions between plants, animals, the environment and human beings, in order to conserve biodiversity, and improve the components of the agroecosystem, concepts very advanced for those dates where the production model was still neoliberal and productivist. In this vein, Velásquez (2023), when testing 32 agroecological practices in the province of Valle Chillón, in Lima, Peru, with 162 producers to whom he gave technical support, found that with the use of agroecological practices implemented in the plots of Producers contribute to reducing the use of chemical inputs, increasing agrobiodiversity and recovering environmental and productive quality.

Regarding the agroecological transition promoted by the Government of Mexico through the Ministry of Agriculture and Rural Development, Iñiguez Rodríguez (2023), indicates that the novelty of the "extension" approach is its territoriality, in his analysis he indicates that the Strategy of Technical Support (EAT) of the PpB, continues to be unidirectional and transfers packaged components, which differs from the work philosophy of the EAT, since it treats the producer as a beneficiary and is the subject of his own development, which involves him based on his resources at UPF, elaborate and incorporate components with agroecological emphasis to production, which leads to food self-sufficiency, thus suggesting an "endogenous" model based on UPF resources, a situation that is currently being handled. For his part, Robles (2022) indicated that the strategy to combat inflation in food must focus on producers generating their own inputs, since for a long time they became consumers. Robles, (2016) already indicated the need to work territorially and give producers certainty from various points of attention to small-scale agriculture: "...1) the importance that these producers have for the country; 2) the signs of exhaustion presented by the Mexican countryside, reflected in a stagnation of productivity, competitiveness and profitability; 3) inefficiency in public spending directed at the rural sector; and, 4) programs in favor of small-scale agriculture have been implemented in several countries in Latin America and the world" (SIC).

For their part, Ubiergo-Corvalan, et al., (2020), in a study with the Ch'ol people of northern Chiapas, found profound wisdom in the management and conservation of agroecological knowledge of the agroecosystem in older people., which means that you can work with them in a better way, since in addition to remaining in the locality they are very attached to habitat conservation, which is consistent with the philosophy of the EAT of the Federal Government of Mexico in the sense of supporting to the holders of the resources, since they are the ones in charge and safeguards of the native production and resources.

#### IV. THE PROPOSED MODEL AND RESULTS

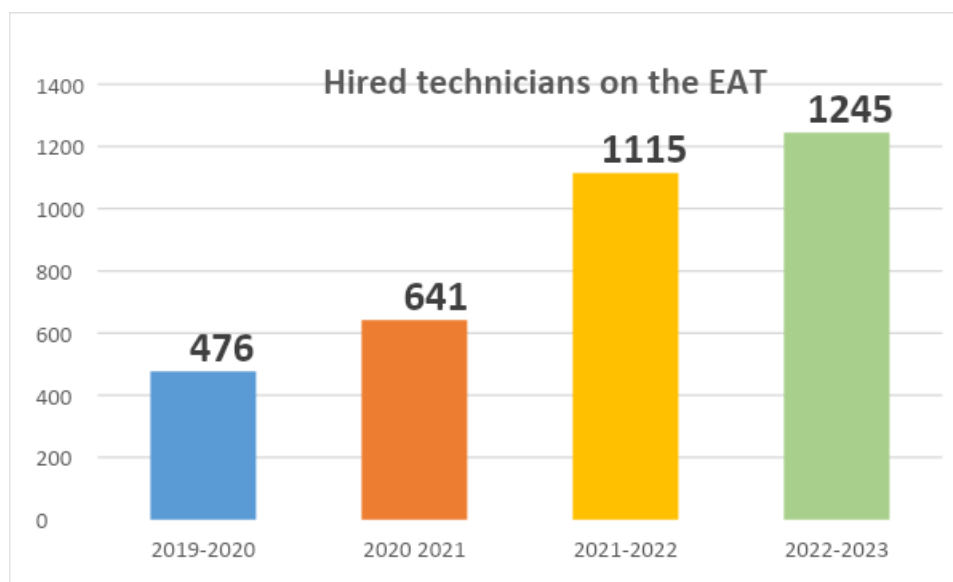
The Production Program for Well-being (PpB) consists of three lines of work, which are: a) direct support for producers; In other words, producers -in its most general definition- receive direct support for cultivating a certain area, or maintaining a certain number of trees, hives or bellies; b) Aspects of commercialization and support for this purpose in the productive chains indicated lines above; and, c) the Technical Accompaniment Strategy (EAT), in addition to INIFAP, specialists from other research institutions or from the educational level converge. In this sense, the EAT consists of six guiding principles that contribute to food self-sufficiency: organization and territory; education and training, agroecological transition, public policy, agrobiodiversity and commercialization. In Figure 1, some of the most outstanding aspects are mentioned and include these six items, which add up to achieve the agroecological transition.



Source: Ministry of Agriculture and Rural Development, 2023.

**Figure 1:** Process for the agroecological transition applied in the Technical Support Strategy of the Production Program for Well-being.

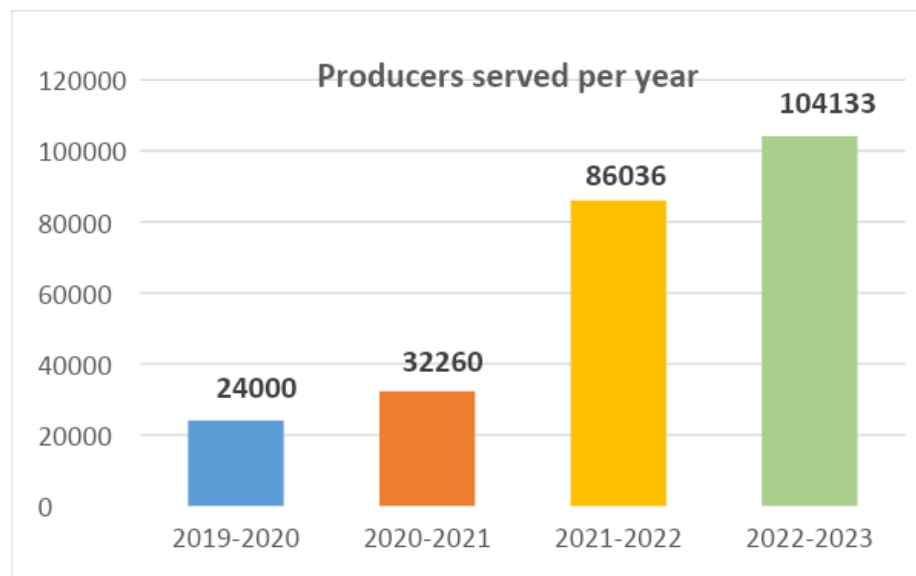
For the above, 1,245 technicians (Figure 2) with profiles of agronomy, biologists, veterinarians and sciences related to the agricultural sector have been hired in the last four years.



Source: Ministry of Agriculture and Rural Development, 2023.

**Figure 2:** Technicians hired in the Technical Support Strategy of the Production for Well-being Program.

With the presence of these technicians and with the accompaniment of 214 INIFAP researchers, attention has been provided to 104,133 producers (Figure 3), of which increasing annual goals have been reached to exceed 30% of what was programmed.



Source: Ministry of Agriculture and Rural Development, 2023.

**Figure 3:** History of producers served in the Technical Support Strategy of the Production for Well-being Program.

Each producer assisted in the number shown in Figure 3, has had contact with at least one agroecological component, which is expected to be incorporated into their UPF, in order to advance in a process of continuous agroecological transition, for this purpose, through community and group assemblies, producers to form part of the Knowledge and Innovation Exchange Modules (MICI), that the important thing has been the inclusion and participation of women (34%) in the productive processes and decision-making within the UPF, for which this EAT is inclusive. Women play a very determining role in the establishment of family gardens for the production of fresh vegetables for self-consumption and depending on the number of members for local sale; The 12,300 family orchards mean, in proportion, that one in 10 producers has at least one orchard for the production of table vegetables.

The results in the agroecological transition are those expected three years after the start of the process between the Ministry of Agriculture and Rural Development and the INIFAP together with the producers. Important advances have been found in the productive goals and cost reduction in some of the productive chains, which are detailed in summary form in the three years:

It began working in 23 territories in the Mexican Republic and in 2023 there are 35 territories served in approximately 600 municipalities (Table 1), which are a priority for the Government of Mexico. The increase in activities is appreciated with the number of hired technicians and established Field Schools, as well as the producers served.

**Table 1:** Advances in the Technical Support Strategy of the Production Program for Well-being in Mexico.

	2019-2020	2020-2021	2021-2022	2022-2023
States	25	25	27	27
Municipalities	350	350	450	600
Territories	23	23	35	35
Productive chains	6	7	11	11
Field Schools	997	1384	3210	4030
Training courses	3151	5705	8986	9057
Producers (N)	24000	32260	86036	104133
Number of Technicians	476	641	1115	1245
Certified Technicians			738	

Source: Ministry of Agriculture and Rural Development, 2023.



Regarding the number of certified technicians in four competency domains, only in the 2021-2022 operating year, 738 were certified and in 2023 there will be 11 competency domains, in which at least 15 upper secondary education and research institutions are participating.

Of the most outstanding results in the process of agroecological transition have been recorded, that of the Maize Field Schools, on average, the yields in Mexico are In relation to grain corn, it is stated that "...the national yield reaches an average of 3.2 t ha<sup>-1</sup>, with the rainfed yield being 2.2 t ha<sup>-1</sup> and irrigation yielding 7.5 t ha<sup>-1</sup>" (Montesillo, 2016). In 2020, the Ministry of Agriculture reports an average yield of 3.4 t ha<sup>-1</sup> (Ministry of Agriculture; 2020), this figure includes the highly producing areas of the center and north of the country, which is why the EAT has exceeded 2.6 at 3.3 t ha<sup>-1</sup>; which means an increase of 26%.

In beans, there is an increase in grain production from 0.4 to 0.71 t ha<sup>-1</sup>, but a significant reduction in production costs by using bio-inputs of 42%, which means in economic terms, that the amount of beans produced is Enough to support producers and their families for 12 months with the usual cost reduction.

In the case of the *Coffea arabica*, coffee production chain, in the 2020-2021 Cycle, from more than 200 samples, differentiated coffees were obtained in 11 of them with more than 85 points, indicating a good cup quality and from the southern state of Chiapas, specifically in an indigenous locality, it was obtained at 86.25 points, this means that the agroecological transition is advancing, since the 2021-2022 operating cycle in more than 54 samples yielded results with more than 86 points, such was the case of San Juan Coatzospam, Oaxaca with 87.25 and La Trinitaria, Chiapas with 86.92.

In the productive chain of *Triticum aestivum* wheat, the results indicate that with agroecological management 4.14 t ha<sup>-1</sup> are obtained, which is 2 tons below the regional average, which is considered a significant advance, since a proportion of bio-inputs: calcium sulfide broths, liquid humus and super lean for its production.

Advances in family farming for milk production are achieved in two years of work, an improvement in milk quality and a reduction in public health risk with the reduction of somatic cells, in addition to the use of bio-inputs for their production in, at least not for this segment of family farming, the production of fertilizers and leachates used in pastures and corn; Likewise, important advances have been made in the substitution of yellow corn for Manihot esculenta cassava flour, as an energy source and thus avoiding the importation of basic grains, which registered very high protein values in local legumes and greater digestibility in 24 hours., of

these by combining the legume *Clitoria ternatea* and with *Pennisetum purpureum* forages.

In order to achieve the gradual substitution of industrial inputs for UPFs with limited resources, the strategy has prepared various bio-inputs to replace industrial inputs, which in many cases are beyond the reach of producers. In this context, there are various products or biopreparations, which have been used in the ECAS of the producers, which can be consulted in the series of publications prepared by the Ministry of Agriculture and Rural Development (2022): for example:

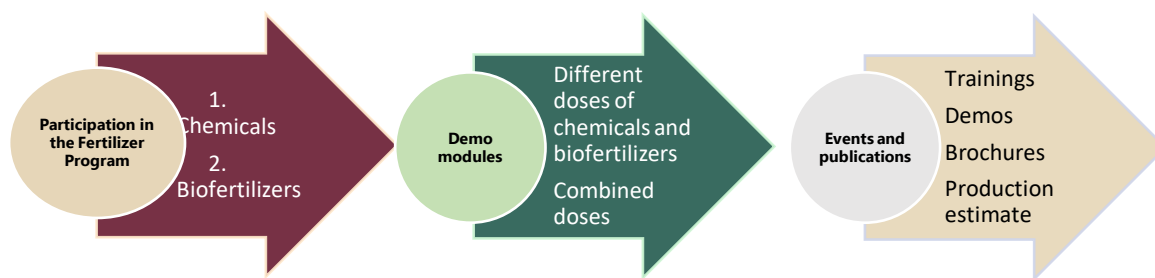
- a) "*Glass water*": "...which is an alkaline solution with an approximate pH of 12, it is used in agriculture as a fungicide, insecticide and organic nutrient; that strengthens the plant immune response to attack by pests and / or diseases, as well as stress by frost and drought".
- b) "*Carbonated water*": "...it is an alkaline compound that is made from a mixture of sodium bicarbonate with natural water and lye soap (for washing), it is made simply and quickly because the ingredients and materials are easily obtaining and is commonly used in agriculture and agroecology".
- c) "*Supermagro*"... is a liquid biofertilizer, obtained through anaerobic fermentation (without the presence of oxygen); It acts as a plant nutrient and can be used in all phenological stages of crops. The product is made up of fresh cow dung, molasses or "piloncillo" or Brown sugar, whey or raw milk, vegetable ash and natural water; can be added: yeast, green plant material, rock flour or minerals such as Zn, Mg, Cb, B, Cu, Ca, Mn, Na and Fe."
- d) "*Bordeaux broth*": this arises from the combination of copper sulfate and slaked lime or hydrated lime (calcium hydroxide). The Bordeaux broth must be neutral or slightly alkaline, with a pH between 6 and 7.5.
- e) "*Calcium sulfide broth*": "...is a mineral product for agricultural use, which can be prepared by farmers. It is used for the prevention and control of some pests and/or diseases; In addition to helping to overcome nutritional deficiencies of calcium and sulfur in crops, it provides nutrients for plant growth, flowering, and fruit set".
- f) "*Steiner Solution*": "...The Steiner universal solution is a fertilizer, which is made up of the macronutrients: nitrogen, phosphorus and potassium; which are the most demanded elements for the development of the crop, and micronutrients such as: chlorine, calcium, magnesium, sulfur, boron, iron, manganese, zinc and molybdenum, the elements required in less proportion".
- g) "*Elaboration of Bocashi*": "...its elaboration is simple and the materials can be obtained locally; Although

they vary according to the availability in each region, it is important that the elements are the following: dry manure (sheep-bovine-goat-poultry-equine), straw or dry stubble (harvest residues), rice husks, charcoal, rock flour, earth, yeast, molasses or piloncillo and water". In Colombia, it was found that with the application of Bocashi and the application of two organic fertilizers, the physical-chemical parameters of the soil are improved, especially the pH, going from acidic to neutral soils. The authors recommend applying 120g/plant, since they are the ones with the best performance. is obtained in the growth and development of the plant, they concluded that; bocashi can be an alternative to organic fertilizers since its results were superior to the local control, (Treviño y Valencia, 2022).

- h) *Compost*: "...to make this compost, it is necessary to stack in layers, various forms of organic matter: dry residues (straw or crop residues), manure, green residues and fresh vegetable residues, mountain soil or finished compost and mineral material (wood ash, rock meal, eggshells). It provides the three essential elements for the development of plants: nitrogen, phosphorus and potassium", what is recommended by the Ministry of Agriculture of Mexico, agrees with what was found in Manabí, Chile, by (Delgado and García, 2023) in the cultivation of tomato and chili.
- i) *Worm Humus*: it is one of the best organic fertilizers and is generated through vermicomposting ecotechnology with some species of earthworms, especially the Californian red *Eisenia foetida*; According to Pedrero (2023) when using Earthworm humus, the physical results were greater robustness of the "tomato" plants *Lycopersicon esculentum* and Chile *Capsicum annum*, and most importantly, no pesticides of any kind were used and served as a substrate for bioremediation in degraded and infertile soils, in the state of Hidalgo in the center of the country.
- j) *Worm Leaching*: "...the leaching is obtained in the vermicomposting process and is an excellent quality liquid to improve, correct and increase fertility in agricultural soils due to its high content of humates which are highly assimilable humic and fulvic acids and usable by the roots of the crops and the microflora and microfauna of the soils and substrates for agricultural planting".
- k) *Mountain Organisms*: "...mountain microorganisms (MM) are mainly microbial inocula with high populations of fungi, bacteria and actinomycetes, which are naturally found in the soil. (Camacho, et al., 2018). They are cheap biofertilizers that contribute to improving the physical and chemical properties of the soil.

## V. SUPPORT FOR TECHNOLOGY TRANSFER

The support scheme for the transfer of the EAT with other programs of the Ministry of Agriculture and Rural Development, due to the energy crisis and inputs for the field due to access to fertilizers and the high cost of these, have been developed alternatives for the production of liquid and solid bio-inputs produced in each Field School, which are not enough to cover the demand of the producers (Figure 4). However, there have been significant advances, specialists indicate that approximately 18 t ha<sup>-1</sup> of solid humus are required, so that in the 4,030 ECAS 100,500 t of composts have been produced, without a homogeneous methodology given the materials to be elaborated. in the locality, therefore it cannot be indicated that the production in each territory and in each ECA is similar, since it serves for the zone or production area, on the other hand, progress has been made in the production of 7'687, 821 liters of worm leachate, which, like solid humus, does not have a standardization of the amounts used for its production, therefore they are used for the region of production. However, the model to achieve food self-sufficiency and processes of the beneficiary producers of the Production for Well-being Program, the objective for the substitution of inputs in soil nutrition is achieved, it is necessary and it is expected that through the transmission of Farmer to farmer or dialogue of knowledge, each member of the Field Schools can be self-sufficient in the supplementation of inorganic chemical fertilizers in their plots. As described in Cuba, Colombia and other countries (Robles, 2016; Iglesias et al., 2022; González, et al., 2022; Krainer et al., 2022; Gerbais-Assogba, et al., 2022; Robles 2022).



Source: Ministry of Agriculture and Rural Development, 2023.

Figure 4: Technology transfer process through a multimedia strategy in the Technical Support Strategy, of the Production for Well-being Program.

## VI. SWOT ANALYSIS OF THE TECHNICAL SUPPORT STRATEGY FOUR YEARS AFTER ITS IMPLEMENTATION

### a) Strengths

The Technical Accompaniment Strategy has as strengths the positioning in the 27 states and 35 territorial regions, for the development of the agri-food chains of corn, milpa, beans, bread wheat, rice, coffee, cocoa, sugar cane, amaranth, chia, honey and milk. INIFAP has an administrative structure in the eight Research Centers and five Disciplinary Research Centers and a National Center for Genetic Resources, which have support infrastructure to work or carry out work-related activities. The Field Schools and their beneficiaries or producers are the main actors and rate the performance of the activities carried out by the technicians; since, they are taught to produce their own bio-inputs and to improve their native seeds with a wide genetic potential and quality of their products. Soils are being rescued and improved, among other things. The products obtained are of higher quality, free of toxic residues, they produce healthy food for their own consumption and for the rest of the population.

### b) Opportunities

The Production for Well-being Program and the Technical Support Strategy are important for the development of communities and indigenous peoples, who had not had knowledge of the technologies for the production and productivity of sustainable food chains. The native seeds will be used and genetically improved in the farmers' fields; as well as the incorporation of agroecological, sustainable and resilient practices. Technical advice and training through technical support from researchers to technicians and from these to producers. The complementarity of resources, spaces and strategies of the different operating programs within the territories. The global trend towards agroecological production, training and education to develop human talent, coupled with this, the certification of all hired technicians in 11 labor competencies is implemented,

through a certifying body and 15 research and secondary education institutions superior.

### c) Weaknesses

The Technical Accompaniment Strategy has problems in some places to form the Field Schools and it occurs when they know the technical personnel and know of the bad background and behavior in the development of their deficient functions or capacities. When agroecological technologies are unknown and there is a lack of work teams for the production of bio-inputs. When the proposed goals are not met in a timely manner and the indicators indicate non-compliance in the production and productivity results of the agri-food service chains in the EAT PPB. As a six-year program, it is not considered in the next six-year period of the federal government.

### d) Threats

The presence of other federal programs and that are doing the duplication of functions or related activities and with the authorization of the Federal Government, mainly; that this be the opportunity to make a decision and the Production for Well-being program disappear without knowing the development of work skills and talents. That there is little participation of the producers and apathy for the agroecological transition. That the technicians do not put the enthusiasm to develop the capacities and talents of the producers, as well as the lack of biofactories and raw materials for the production of bioinputs. That there are no efficient and effective programs for the production of improved native seeds and conservation schemes, in such a way that transgenic seeds invade.

## VII. FINAL CONSIDERATIONS

The results indicate that according to the prolegomena indicated in development theories, this model implemented by the Government of Mexico has touched at least two crucial points framed in the global objectives of 20-30, among them: human development, since the rural population is seen as a beneficiary of the

actions of the Mexican State and not as a subject of them, in addition to a marked inclusion of gender and inclusiveness; On the other hand, the technological offer available with an agroecological emphasis was privileged, without neglecting empirical knowledge that helps preserve the environment and be resilient against the extractive forces of productivity, necessary to achieve food self-sufficiency. The Production for Well-being program represents an interesting application exercise integrating at least three models of agricultural development; sustainability, humanism and diffusion of innovations. Sustainability is addressed as the agroecological transition. Its central element is human development, through the participation of producers; men and women, motivated by young agroecological technicians, promoting food production, with added value, and supporting marketing and associativity, with full respect for their individual and collective rights. On the other hand, the diffusion of innovations materializes in the participatory process of training and technical support based on Field Schools, with the learning-by-doing approach. Undoubtedly, in a short time it will be possible to observe the results in the lives of Mexicans who, for the first time, are considered in the public policy of our country, however, information is required to verify the adoption or incorporation of at least two agroecological components, provided that the EAT implementation cycle is completed, at least where work has been done in the last three years, in such a way that they are not just figures or statistics, but testimonials and productive evidence of improvements in food self-sufficiency or visualize through these studies the factors that influence the acceptance, adaptation or rejection of agroecological components at UPF and in each of the production chains supported by the Production for Well-Being Program.

## BIBLIOGRAPHY

- Altieri, M. y Nicholls, C. (2010). Diseños Agroecológicos para incrementar la biodiversidad de entomofauna benéfica en agroecosistemas. Sociedad Científica Latinoamericana de Agroecología (SOCLA). <https://multiversidad.es/2015/11/disenos-agroecologicos-incrementar-labiodiversidad-entomofauna-benefica-agroecosistemas/>
- Camacho, Fabricio & Uribe, Lidieth & Newcomer, Quint & Masters, Karen & Kinyua, Maureen. (2018). Bio-optimización del compost con cultivos de microorganismos de montaña (MM) y lodos digeridos de biodigestor (LDBIO). UNED Research Journal. 10. 330. 10.22458/urj.v10i2.2163. Consulta a través de: [https://www.researchgate.net/publication/327898054\\_Bio-optimizacion\\_del\\_compost\\_concultivos\\_de\\_microorganismos\\_de\\_montana\\_MM\\_y\\_lodos\\_digeridos\\_de\\_biodigestor\\_LDBIO](https://www.researchgate.net/publication/327898054_Bio-optimizacion_del_compost_concultivos_de_microorganismos_de_montana_MM_y_lodos_digeridos_de_biodigestor_LDBIO)
- Carlos Venegas V.; Bárbara Gómez M.; Agustín Infante L.; y Raúl Venegas V. 2018. Manual de transición agroecológica para la agricultura familiar campesina. Instituto de Desarrollo Agropecuario de Chile. Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO). Manuales y cursos N° 12. P 29
- Claude-Gervais Assogba; Gbelidji T. Vodouhê, Bienvenu Adjé; Anicet Dassou; Silvere D. Tovignan d, Valentin Kindomihou; Simplicie D. Vodouhê. 2022. Agroecological transition in Southern Benin: What challenges for more efficient vegetable farming systems? In: Journal of Agriculture and Rural Development in the Tropics and Subtropics (JARTS) Vol. 123 / No. 2 (2022-10-18) , S. 205-214 ; eissn: 2363-6033
- Delgado-Zambrano; María José; y García-Mera, Christopher Leroi. 2023. Contenido nutricional del compost a partir de residuos agropecuarios en la ESPAM MFL. Tesis de Licenciatura. Escuela Superior Politécnica Agropecuaria de Manabí Manuel Félix López; República de Chile 99 p
- Guadarrama-Zugasti, Carlos; Trujillo-Ortega, Laura. 2019. Revisando el enfoque evolutivo de la transición agroecológica. Editores. Editores Técnicos Davi Lopes do Carmo Djalma Silva Pereira Elizangela da Silva Miguel Sílvia Oliveira Lopes Sílvia Eloiza Priore. En: Pesquisa em Agroecologia: conquistas e perspectivas. Simpósio de Pós-graduação em Agroecologia da Universidade Federal de Viçosa SIMPA-UFV pp 29-43
- González Pérez, Y., Álvarez Marqués, J. L., Rodríguez Jiménez, S. (2022). Caracterización de una Finca Familiar campesina en Transición Agroecológica. Revista Científica Agroecosistemas, 10(2), 116-122. <https://aes.ucf.edu.cu/index.php/aes>
- Iglesias-Gómez, J. M., Toral-Pérez, O. C. y Rodríguez-Licea, G. (2022). Evaluación de la biodiversidad en una finca en transición agroecológica. Terra Latinoamericana, 40, 1-12. e957. <https://doi.org/10.28940/terra.v40i0.957>
- Iñiguez-Rodríguez, Claudia Catalina. 2023. Los modelos de extensión rural en México ¿Desempaquetar la política pública? ¿Por qué no?. Revista trasregiones. Universidad de Guadalajara. AÑO 3, NO. 5, ENERO-JUNIO 2023. Pp 129-160
- Krainer-Anita, Hidalgo-Palma, Karla Alejandra Conejo-Males, María Matilde. 2022. Rural alternatives for local development: an intercultural analysis (cases from northern Ecuador). Journal of Agriculture and Rural Development in the Tropics and Subtropics Vol. 123 No. 2 (2022) 273–284 <https://doi.org/10.17170/kobra-202212227258>
- Maldonado García, J., & Garcia Vazquez, A. I. (2022). Saberes locales y transición agroecológica



- en dos comunidades rurales de Sierra de Lobos, Guanajuato. *Entreciencias: Diálogos En La Sociedad Del Conocimiento*, 10 (24). <https://doi.org/10.22201/enesl.20078064e.2022.24.82865>
12. Melissa Katherine Triviño Mideros Juan Camilo Valencia Angulo. 2022. Eficiencia de Abonos Orgánicos (HUMUS Y BOCASHI) en cultivo de *Solanum lycopersicum* (TOMATE) Y *Capsicum annum* (PIMENTON), como alternativa de seguridad alimentaria en huertas urbanas. Tesis de Ingeniero ambiental y sanitario. 93 p
13. Montesillo-Cedillo, José Luis. 2016. Rendimiento por hectárea del maíz grano en México: distritos de riego vs temporal. *Economía Informa* núm. 398 mayo – junio |2016. Instituto de Estudios sobre la Universidad (IESU) de la Universidad Autónoma del Estado de México. Pp 60-74
14. Pedrero Huerta, G. (2023). Desarrollo de plantas comestibles por efecto de su rizósfera como abono microbiológico para zonas de tierra poco fértil. *Ciencia Latina Revista Científica Multidisciplinar*, 7(1), 7226-7234. [https://doi.org/10.37811/cl\\_rcm.v7i1.4955](https://doi.org/10.37811/cl_rcm.v7i1.4955) Robles-Berlangua,
15. Héctor Manuel. 2022. Fortalecer a los pequeños agricultores para cumplir con el plan contra la inflación. En: Fortalecer a los pequeños agricultores para cumplir con plan contra la inflación (eleconomista.com.mx)
16. Robles-Berlangua, Héctor Manuel. 2016. La pequeña agricultura campesina y familiar: construyendo una propuesta desde la sociedad. Entre Diversidades: Revista de Ciencias Sociales y Humanidades. División de Ciencias Sociales y Humanidades /Departamento de Política y Cultura. Universidad Autónoma de Chiapas. Red Gestión Territorial para el Desarrollo Rural Sustentable, Año 2016, Número 7. Dedicado a: Otoño-invierno. Pp 43-86
17. Secretaría de Agricultura y Desarrollo Rural 2022. Manuales Prácticos Para La Elaboración De Bioinsumos. [www.gob.mx/agricultura](http://www.gob.mx/agricultura).
18. Secretaría de Agricultura y Desarrollo Rural, 2020. Boletín mensual de producción Maíz grano. Servicio de Información Agroalimentaria y Pesquera (SIAP). Gobierno de México. [Avance\\_de\\_producción\\_maíz\\_grano\\_FEB\\_2020.pdf \(www.gob.mx\)](http://www.gob.mx/agricultura)
19. Vivas-García, Julián Augusto and Acevedo-Orsorio, Álvaro. 2023. MOVILIZACIONES CAMPESINAS, POLÍTICA PÚBLICA Y TRANSICIONES HACIA LA AGROECOLOGIA EN COLOMBIA, 1990- 2018. *Tropical and Subtropical Agroecosystems* 26 (2023): #014. Facultad de Ciencias Agrarias. Universidad Nacional de Colombia. Ciudad Universitaria. Edificio 500. Código Postal UN.11001, Bogotá, Colombia. 21 p <http://doi.org/10.56369/tsaes.4291>
20. Ubierno-Corvalán, P., Rodríguez-Galván, G., Casas-Fernández, A., Zaragoza-Martínez, L., & Ponce-Díaz, P. (2020). Plantas comestibles del solar maya ch'ol, Chiapas. Tuxtla Gutiérrez, Chiapas. México: Universidad Autónoma de Chiapas.
21. Velásquez-Alcántara, Domingo. 2023. Fortalecimiento de capacidades técnico-productivas mediante la promoción de la agroecología con agricultores del Valle Chillón, Lima” Tesis de Licenciatura en Agronomía. Universidad Nacional Agraria La Molina Facultad De Agronomía. 113 pp.
22. Ayelén, H.M. 2017. Construcción historica del actual concepto de desarrollo sostenible. Antecedentes de problemáticas socioeconómicas y ambientales. *Ciencias administrativas*. No. 10. Argentina. Pp. 15 – 27.
23. Max –Neef M., Elizalde A y Hopenhayn. 1986. Desarrollo a escala humana. Una opción para el futuro. *Development dialogue*. Número especial. Cepaur. Chile. S/p.
24. De Janvry, A. 1975. The importance of small farmer technology for rural development. En *Proceedings of the seminar on economic analysis in the design of new technologies for the small farmer*. CIAT. Colombia. Trad. Juan Antonio Leos Rodríguez.
25. Stavenhagen, R. 1981. Siete tesis equivocadas sobre América Latina. *Sociología y subdesarrollo*. México. Nuestro tiempo. Pp 15 – 84.
26. Eicher C., y Staatz, J. 1984. Models of agricultural development. Ed. *Agricultural development in the Third World*. The John Hopkins University Press. Pp 38 – 45.
27. Varela, F. 2005. Centrar el desarrollo en las personas. Aplicación del concepto de desarrollo humano en proyectos, programas y políticas en el marco de la reducción de la pobreza. *Dossier Técnico* no. 3.
28. Rodríguez, G.R. y Hesse – Rodríguez, M. 2000. Al andar se hace camino. Guía metodológica para desencadenar procesos autogestionarios alrededor de experiencias agroecológicas. Kimpres Ltda. Colombia. 152 p.
29. Bunch, R. 1982. Dos mazorcas de maíz. Una guía para el mejoramiento agrícola orientado hacia la gente. *Vecinos mundiales*. 268 p.
30. López – Calva, L.F., y Vélez G.R. 2003. El concepto de desarrollo humano, su importancia y aplicación en México. *Estudios sobre desarrollo humano*. PNUD México. Núm. 1. 46 p.
31. Sepúlveda, G.I. 1992. El cambio tecnológico en el desarrollo rural. Universidad autónoma Chapingo. México. 159 p.

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- j) There should be brief acknowledgments.
- k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.



## FORMAT STRUCTURE

***It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.***

All manuscripts submitted to Global Journals should include:

### **Title**

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

### **Author details**

The full postal address of any related author(s) must be specified.

### **Abstract**

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

### **Keywords**

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

### **Numerical Methods**

Numerical methods used should be transparent and, where appropriate, supported by references.

### **Abbreviations**

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

### **Formulas and equations**

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

### **Tables, Figures, and Figure Legends**

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.



## Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

## PREPARATION OF ELETRONIC FIGURES FOR PUBLICATION

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

## TIPS FOR WRITING A GOOD QUALITY SOCIAL SCIENCE RESEARCH PAPER

Techniques for writing a good quality human social science 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 human social science 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](#).



**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.

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.

**19. 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.



**20. 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.

**21. 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.

**22. 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 through 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.





### *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.



**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.



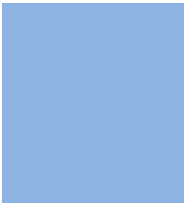
CRITERION FOR GRADING A RESEARCH PAPER (COMPILATION)  
BY GLOBAL JOURNALS

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Topics	Grades		
	A-B	C-D	E-F
<i>Abstract</i>	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
<i>Introduction</i>	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
<i>Methods and Procedures</i>	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
<i>Result</i>	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
<i>Discussion</i>	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
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring







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