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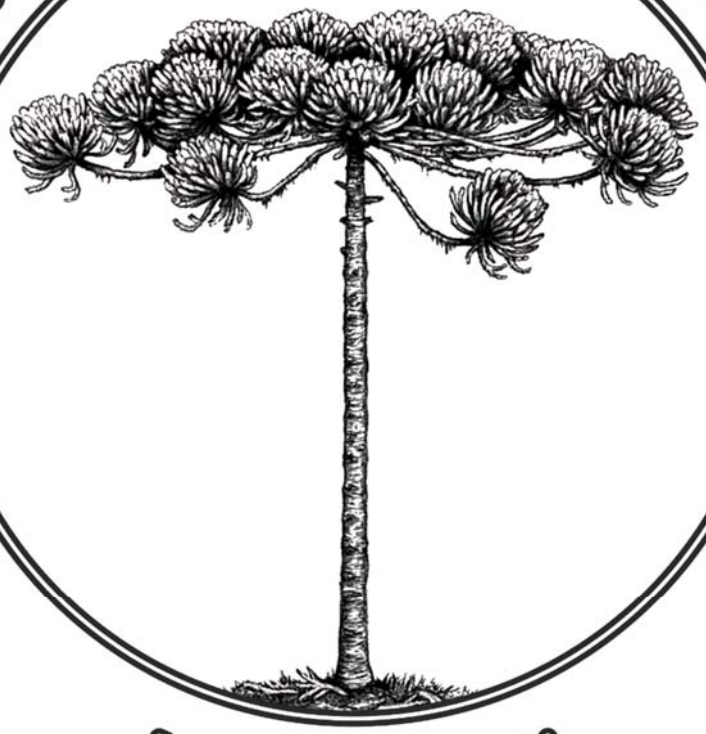

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TABLE OF CONTENTS

Journal of Law, Public Polices and Human Sciences

Academic and professional body for scientific dissemination

BOOK SUGESTION	SUBMISSION PROCESS
SUGESTÃO DE LEITURA: MEDITAÇÕES. *READING SUGGESTION: MEDITATIONS*. Pg. 104	**General Information** Pg. 105

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INTERVIEW – PUBLIC POLICES

INTERROMPER A ADIÇÃO DE FLÚOR NA ÁGUA?

STOP ADDING FLUORIDE TO THE WATER?

Carlos Gomes Bezerra *
Câmara dos Deputados, Brasil.

Entrevistado por:
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JLPPHS, Brasil

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Invited 17 January 2021; completed 20 March 2021.

RESUMO

Introdução: A presente entrevista com o Sr. Deputado Federal Carlos Bezerra, versa sobre o projeto de Lei nº 6359/2013, de 2013, que visa revogar a Lei nº 6.050, de 24 de maio de 1974, que "*dispõe sobre a fluoretação da água em sistemas de abastecimento quando existir estação de tratamento*". O PL justifica que foi constatado que a ingestão elevada dessa substância provocava fluorose. **Objetivo:** conhecer melhor o PL 6359/2013, questionar sobre outros possíveis efeitos colaterais da fluoretação da água que o PL 6359/2013 pode sanar. **Métodos:** a entrevista foi formulada utilizando-se o conteúdo do PL 6359/2013 como base. Estudos internacionais, publicados majoritariamente em periódicos científicos indexados, forneceram os meios para a formulação de perguntas adicionais, que relacionam a fluoretação da água com a possibilidade de outros distúrbios, incluindo a possibilidade de redução das capacidades cognitivas. Também foram superficialmente abordados possíveis efeitos sócio-econômicos da fluretação da água. **Resultados e Discussão:** O PL 6359/2013 foi fundamentado em argumentação consistente e sua proposição é compreensível aos legisladores. Questões abordadas que poderiam relacionar a fluoretação da água com outras situações de saúde, ou sociais, poderão ser novamente levantadas em situação futura apropriada. **Conclusões:** o PL 6359/2013 foi fundamentado em evidencias científicas e empíricas sólidas, e propôs a alteração da legislação prévia (Lei nº 6.050, de 24 de maio de 1974), visando a preservação da saúde da população.

Palavras-chave: *Fluretação da água, efeitos colaterais da fluoretação da água, Projeto de Lei 6359/13, previdência social, desenvolvimento social.*

ABSTRACT

Background: The present interview with Mr. Federal Deputy Carlos Bezerra deals with Bill 6359/2013 of 2013, which aims to revoke Law No. 6,050, of May 24, 1974, which "provides for the fluoridation of water in supply systems when there is a treatment plant ". The PL justifies that it was found that the high intake of this substance caused fluorosis. **Objective**: to get to know PL 6359/2013 better, to ask about other possible effects of water fluoridation that PL 6359/2013 can remedy. **Methods**: the interview was conducted using the content of PL 6359/2013 as a basis. International studies, published mostly in indexed scientific journals, have provided the means for informing additional questions, which relate water fluoridation to the possibility of other disorders, including a possibility of reducing cognitive needs. The socio-economic effects of water fluoridation were also superficially possible. **Results and Discussion**: PL 6359/2013 was based on consistent arguments, and its proposition is understandable to legislators. Issues addressed that may relate water fluoridation to other health or

social situations can be raised again in an appropriate future situation. **Conclusions**: PL 6359/2013 was founded on solid scientific and empirical evidence and proposed the amendment of the previous legislation (Law No. 6,050, of May 24, 1974), aimed at preserving the health of the population.

Keywords: *Water fluoridation, side effects of water fluoridation, Bill 6359/13, social security, social development.*

Figure 1- Deputado Federal Carlos Bezerra (PMDB-MT).

1. Sr. Deputado Carlos Bezerra, visando o início da entrevista, o senhor poderia apresentar ao público, em especial aos não Mato-Grossenses, a sua formação e um breve histórico de sua carreira política?

1.1 Formação acadêmica:

Resposta: Bacharel em Ciências Jurídicas e Sociais, formado em 1969 pela Universidade Federal de Mato Grosso (UFMT).

1.2 Descreva sua Carreira política:

Resposta: Participei da fundação do MDB (Movimento Democrático Brasileiro), no Estado, partido ao qual pertenço até hoje. Primeiro mandato em 1974, como deputado estadual. Em 1978, eleito deputado federal; Em 1982, prefeito de Rondonópolis, um dos principais polos econômicos de Mato Grosso. Governador do Estado no período de 1987 a 1990. Nas eleições de 1992, eleito novamente prefeito de Rondonópolis. Em 1994, eleito Senador para o período de 1995 a 2003, tendo exercido a presidência da Comissão Mista do Orçamento da União e, posteriormente, a relatoria-geral. Atualmente, presidente regional do MDB em Mato Grosso e deputado federal no quarto mandato consecutivo, desde 2007.

1.3. Outros projetos relevantes, além do projeto de Lei 6359/13 [1], do deputado Carlos Bezerra (PMDB-MT), que revoga a obrigatoriedade de as companhias de abastecimento colocarem flúor na água, quando existir estação de tratamento. Essa exigência está na Lei 6.050/74 e foi instituída com o objetivo de prevenir as cáries dentárias. Por favor, cite outras três contribuições que o senhor julga relevantes ao longo de sua carreira.

Resposta: A PEC das domésticas; a Lei Ordinária 12.895/2013 que obriga os hospitais de todo o país a manter em local visível de suas dependências aviso informando sobre o direito da parturiente a acompanhante; a Lei Ordinária

Proposta de Emenda à Constituição n° 66, de 2012

Altera a redação do parágrafo único do art. 7º da Constituição Federal para estabelecer a igualdade de direitos trabalhistas entre os trabalhadores domésticos e demais trabalhadores urbanos e rurais.

LEI Nº 12.895, DE 18 DE DEZEMBRO DE 2013.

Altera a Lei nº 8.080, de 19 de setembro de 1990, obrigando os hospitais de todo o País a manter, em local visível de suas dependências, aviso informando sobre o direito da parturiente a acompanhante.

LEI Nº 13.770, DE 19 DE DEZEMBRO DE 2018

Altera as Leis nºs 9.656, de 3 de junho de 1998, e 9.797, de 6 de maio de 1999, para dispor sobre a cirurgia plástica reconstrutiva da mama em casos de mutilação decorrente de tratamento de câncer.

13.770/2018 que dispõe sobre a cirurgia plástica reconstrutiva da mama em casos de mutilação decorrente de tratamento de câncer.

2. Analisando o Projeto de Lei 6359/13, é possível notar que o senhor foi bastante reservado e consciente ao apontar apenas que o excesso de flúor provoca fluorose, doença que torna os dentes porosos e quebradiços. Ao elaborar o PL 6359/13 o senhor teve alg um receio em causar algum tipo de controvérsia ao apontar outras doenças que possivelmente são associadas ao uso do flúor?

Resposta: A inserção de flúor na água foi decorrente da ideia de que essa prática ajudaria a conter os casos de cárie da população. Os estudos mais consolidados apontavam que somente a inserção do flúor na água não previne necessariamente a cárie e pode trazer problema mais grave para a população como a fluorose, para que a questão fosse abordada de forma mais objetiva escolhemos esse ponto como foco. Mas também abordamos os casos de câncer ósseo, perda de cálcio nos ossos e envelhecimento precoce estudados nas universidades dos Estados Unidos e da Índia. Lemos muitos estudos que também apontam para uma série de outras doenças, mas como haviam estudos controversos preferimos objetivar com a fluorose, porque seria uma doença mais grave e de tratamento mais caro do que a cárie dentária.

3. Quais são todas as etapas necessárias para que este PL possa se tornar realidade? Quanto tempo pode demorar cada etapa? Quais os possíveis entraves que o PL pode encontrar nas votações?

Resposta: Ele foi aprovado na Comissão de seguridade social e família, na qual teve parecer favorável, com substitutivo do deputado Mandetta, e agora deve ser aprovado pela Comissão de Justiça e Cidadania. Caso seja aprovado e não haja recurso, ele segue para o Senado, lá deve ser aprovado pelas comissões. Se não houver recurso para Plenário e obtiver aprovação nas Comissões deve ser transformado em lei. O principal entrave é que algumas pessoas ou instituições ainda acreditam que o flúor na água beneficia a população.

4. Sernhor Dep. Carlos Bezzera, concordo com o senhor que a inclusão de flúor na água para abastecimento público "é fruto de um equívoco científico" do final do século 19. O excesso de flúor, conforme o senhor já destacou, provoca fluorose, doença que torna os dentes porosos e quebradiços. Por qual motivo o senhor escolheu este ponto em específico para embasar o PL?

Resposta: Porque era o ponto mais objetivo e que contradizia que o flúor na água levava à saúde dentária.

4.1- Estudos [2,3] permitem comparar o desenvolvimento da cárie dental entre os países que fluoretam e não fluoretam a água. Em ambos os casos ocorreu a redução da incidência de cáries, conforme o gráfico abaixo. Seria possível associar este fato as práticas mais avançadas e consistentes de higiene oral, ou a mudança de hábitos alimentares, ao invés de dar este crédito exclusivamente a fluoretação da água? Notando que em ambos os casos ocorreu uma redução da incidência de cáries?

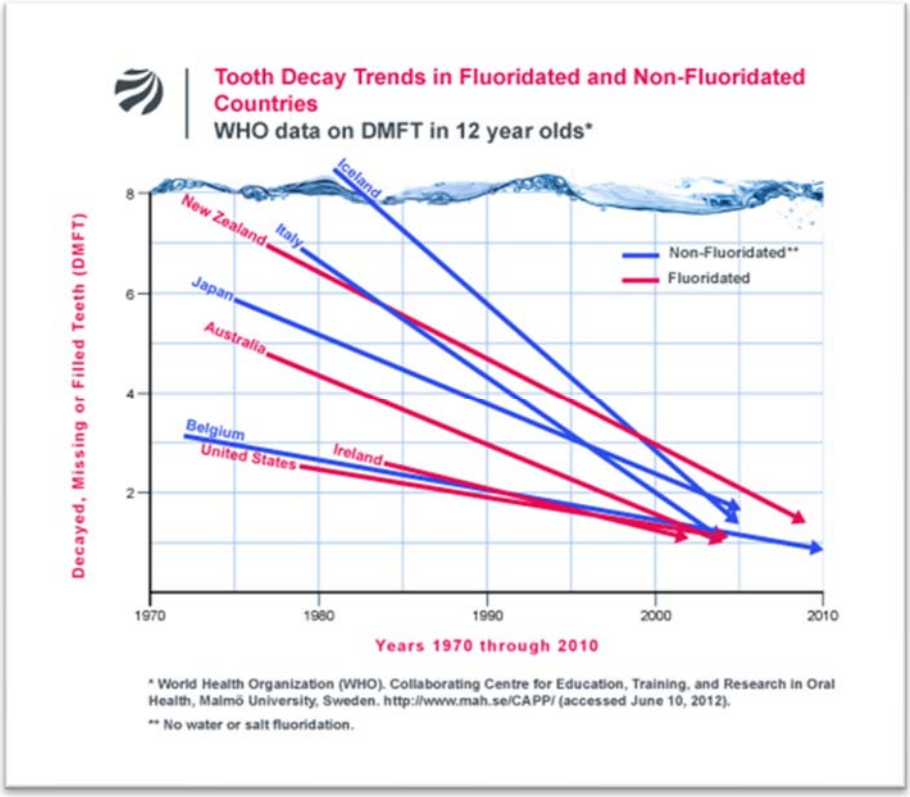

Figure 2<fonte https://fluoridealert.org/articles/50-reasons/>

Resposta: É o que os gráficos demonstram, por eles não há correlação entre o flúor na água e a saúde dentária.

5. Há um estudo, "*Physical exercise ameliorates the toxic effect of fluoride on the insulin-glucose system*" [4] que aponta que a ingestão diária de 1,5 mg/L ou acima (através da água) induz a resistência à insulina. A resistência a insulina é relacionada ao diabetes [5], ao se planejar a prevenção das cáries, sem querer a legislação acabou colaborando para a elevação dos casos de diabetes?

Resposta: Se esse estudo for realmente comprovado por várias instituições, ao que demonstra chegarão a essa conclusão.

5.1- Ao elaborar o PL 6359/13, o senhor estimou os gastos do SUS com o tratamento do diabetes?

Resposta: Como não focamos na diabetes na elaboração do projeto de lei, não fizemos esse estudo.

6- Alguns estudos [6,7,8] apontam que a exposição crônica ao flúor reduz ou altera os hormônios da tireoide em mamíferos. O SUS também faz este tipo de cobertura? Qual o custo anual estimado para tratar alterações ou disfunções da tireoide?

Resposta: Não temos esses dados.

7- Um estudo de Harvard [9] sobre o impacto do flúor no desenvolvimento neurológico de crianças, outro sobre alterações induzidas pelo flúor em proteínas relacionadas às sinapses no córtex cerebral do cérebro de camundongos [10], e outro que indica como a exposição ao flúor durante o desenvolvimento afeta a cognição e a emoção em camundongos [11]. Considerando que mamiferos compartilham muita similaridade genética, e camumdongos são comummente utilizados como cobaias por este motivo, aparece uma questão. Será que o desempenho insatisfatório dos estudantes brasileiros no exame do PISA [12] pode ter relação com a fluoretação da água?

Resposta: Seria necessário um estudo mais aprofundado para essa conclusão.

7.1- Como o senhor balanceou os objetivos do MEC, que investe milhões na educação, e ao mesmo tempo uma legislação possivelmente ultrapassada, obriga a introdução de supostos agentes neurotóxicos na água?

Resposta: Não avaliamos esse ponto na elaboração do projeto de lei.

7.2- Caso a PL 6359/13 não seja aprovada logo, o senhor considera que seria moralmente adequado, ou economicamente correto, o MEC introduzir nos "kits educacionais" filtros de água para remoção de flúor? Visando evitar uma suposta redução das capacidades cognitivas dos estudantes brasileiros causada pela fluoretação excessiva da água?

Performance trends

Figure 2. Trends in performance in reading, mathematics and science

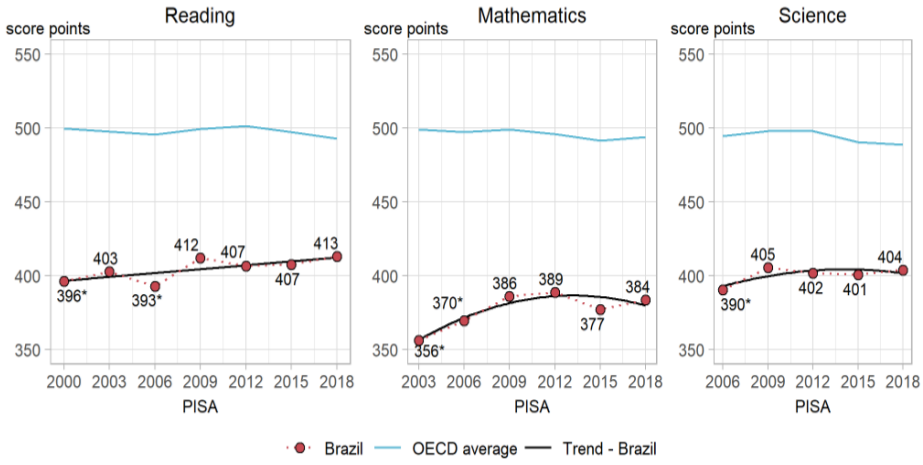

Figure 3 Fonte: https://www.oecd.org/pisa/publications/PISA2018_CN_BRA.pdf (12)

Resposta: Será necessário um estudo aprofundado sobre a matéria para alguma conclusão sobre esse ponto.

8. O gráfico abaixo, obtido no google, com dados do Banco Mundial, apresenta a taxa de natalidade dos brasileiros [13]. Um estudo [13] correlaciona a exposição a altas concentrações de flúor à queda na taxa de natalidade. Qual é o futuro de uma nação incapaz de manter uma razoável taxa de natalidade?

Resposta: Isso ocorre em vários países, e diversos são os fatores que influenciam nessas estatísticas. O nosso trabalho, portanto, contribui para enfrentarmos essa luta.

Figura 4. Nascimentos por mulher. Fonte: https://www.google.com/search?q=taxa+de+nascimento+no+brasil&newwindow=1&client=firefox-b-d&sxsrf=ALeKk02j0ZWM-ClhGdJt1M-qrq_n1E77Bw%3A1617970531708&ei=Y0VwYPjwKoHW5OUPipiS8AI&oq=taxa+de+nascimento&gs_lcp=Cgdnd3Mtd2l6EAEYADICCAAyAggAMgIIADICCAAyAggAMgIIADICCAAyBggAEBYQHjIGCAAQFhAeMgYIABAWEB46CAgAELEDEIMBOg4IABCxAxCDARDHARCvAToOCAAQsQMQgwEQxwEQowI6BQgAELEDOgQIIxAnOgIILjoHCAAQsQMQQzoECAAQQzoICAAQsQMQyQM6BQgAEMsBUPXvugNYpYy7A2DgnLsDaARwAHgAgAHnAYgB4xOSAQYwLjE4LjGYAQCgAQGqAQdnd3Mtd2l6wAEB&sclient=gws-wiz.

8.1 O Brasil já é um país de população idosa?

Resposta: Dados do IBGE (Instituto Brasileiro de Geografia e Estatística) mostram que a tendência de envelhecimento da população (em 2020 com mais de 210 milhões), vem se mantendo e o número de pessoas com mais de 60 anos já é superior ao de crianças com até nove anos de idade. Existe um estudo que aponta que até o ano de 2050 a população com mais de 65 anos no País se multiplicará por quatro. Passará de 13 a 51 milhões!

8.2. Como o Brasil planeja fazer a previdência social, havendo muito mais idosos para receber aposentadoria do que adultos economicamente ativos contribuindo para a base do sistema previdenciário? É possível equalizar esta situação?

Resposta: A questão da Previdência é um desafio constante na maioria dos países, e assim deve ser enfrentado com as reformas, não só previdenciária, mas também trabalhista, tributária.

8.3. Ao não manter taxas de natalidade consistentes, a população nativa vai paulatinamente desaparecer, ou ser reduzida. Nós seremos substituídos?

Resposta: Não podemos fazer futurologia, mas devemos estar atentos às estatísticas. Temos, sim, que trabalhar, principalmente com foco na melhor qualidade de vida da população. No Parlamento, procuramos dar nossa contribuição, a exemplo do projeto de lei em questão que tive a iniciativa de apresentar.

9. Por que a Lei Federal no 6.050, de 24 de maio de 1974 que determina a fluoretação não foi revisada, até o senhor assumir a situação?

Resposta: Creio que seja porque acreditava-se que estavamos fazendo o correto ao fluoretar a água.

10. O senhor tem uma projeção de redução de custos, economia, no tratamento da água pala simples desobrigação da fluoretação?

Resposta: Não fizemos esse cálculo porque nosso foco é a saúde da população, e como seria uma redução do gasto, a parte financeira não seria um entrave e sim um benefício.

11. Quais outras considerações a

respeito deste tema, que não foram abordadas acima, que o senhor gostaria de discorrer sobre?

Resposta: Os países mais desenvolvidos no mundo não utilizam a fluoretação, o flúor na água acaba trazendo muitos malefícios porque a população que utiliza essa água não tem como simplesmente dosar ou não utilizar a água com flúor. Hoje, a população urbana tem acesso a pasta dentária e a escova dentária inclusive pelo Sistema Único de Saúde (SUS). O restante da pulação que não tem acesso aos itens de higiene dentária também não tem acesso a água tratada, o que torna muito ineficiente essa política.

A quantidade de flúor na pasta dentária já é mais do que suficiente para garantir a quantidade de flúor que cada indivíduo deve ser exposto, porém, o excesso está causando um problema mais grave de saúde bucal que é a fluorose.

Existem vários estudos que apontam que o excesso de flúor pode causar um elevado número de doenças, portanto, se olharmos objetivamente essa política, vemos que ela não atinge a quem poderia ser útil, pois a população sem acesso aos itens de higiene dentária também não tem acesso a água tratada.

Editores: Ilustre Deputado Bezerra, o jornal agradece sua disponibilidade em nos fornecer esta entrevista. E fazemos votos de poder contar com sua participação novamente no futuro.

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RESEARCH PAPER

DISPONIBILIDADE DE ALCOÓIS NÃO BEBIVEIS NA RÚSSIA EM 2015-2020: AS POLÍTICAS DE CONTROLE IMPLEMENTADAS DESDE 2005 FORAM EFETIVAS?

AVAILABILITY OF NON-BEVERAGE ALCOHOLS IN RUSSIA IN 2015-2020: WERE CONTROL POLICIES IMPLEMENTED SINCE 2005 EFFECTIVE?

ДОСТУПНОСТЬ НЕПИТЬЕВОГО АЛКОГОЛЯ В РОССИИ В 2015-2020 ГОДАХ: БЫЛА ЛИ ПОЛИТИКА ПО ЕГО КОНТРОЛЮ, ПРОВОДИМАЯ С 2005 ГОДА, ЭФФЕКТИВНА?

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RESUMO

O consumo álcoois não bebíveis é um aspecto importante do alooclismo, impactando na mortalidade por várias *causa mortis*. Desde 2005, os álcoois não bebíveis na Rússia têm sido objeto de regulamentação ativa para controlar seu consumo. Este estudo teve como objetivo determinar se os álcoois não bebíveis estavam disponíveis na Rússia em 2015–2020 para avaliar a eficácia das políticas de controle implementadas. Durante a primeira fase da pesquisa entre 2015 e 2017, 50 cidades russas de vários tamanhos, tipos e locais foram monitoradas. A segunda fase foi realizada entre 2018 e 2020 em 5 cidades, que foram monitoradas durante a primeira fase. Os pesquisadores de campo visitaram vários pontos de venda e compraram amostras de álcoois que não são bebidas: líquidos espirituosos com um teor de etanol de pelo menos 60% em volume, vendidos a um preço inferior a 45 rublos por garrafa ($ 0,57, € 0,49, £ 0,44). Até 2016, vários tipos de álcoois não bebíveis, conhecidos por serem consumidos, estavam disponíveis no varejo. A disponibilidade desses álcoois diferia entre as cidades, dependendo do nível de aplicação local dos regulamentos de controle. Os regulamentos promulgados em resposta ao surto massivo de intoxicações por álcoois não bebíveis em Irkutsk em 2016, causado pelo consumo de metanol contendo aditivo de banho falso "Hawthorn", retirou do mercado vários tipos de álcoois não bebíveis, reduzindo significativamente sua disponibilidade desde 2017. No entanto, fontes de etanol de baixo custo, como tinturas medicinais, anti-sépticos, água-de-colônias não desnaturadas, permaneceram disponíveis em 2017-2020, enquanto novos tipos de álcoois não bebíveis baratos adequados

para beber foram introduzidos no mercado (anti-sépticos para uso veterinário, desinfetantes de mãos anti-SARS-CoV-2). As bebidas alcoólicas ilegais comumente produzidas a partir de etanol farmacêutico/medicinal desviado também estavam disponíveis em redes de varejo que vendem álcoois não bebíveis. Desde 2005, as políticas implementadas e especialmente aquelas reforçadas e recentemente promulgadas em 2017 e posteriormente em resposta ao surto de Irkutsk em 2016, podem de fato ter reduzido a disponibilidade física de álcoois não consumíveis. No entanto, uma ação mais decisiva ainda é necessária para prevenir o consumo de tipos específicos de álcool não-bebíveis e bebidas alcoólicas ilegais, que são comumente produzidos a partir do álcool lícito ou desviados do mercado legal, não registrado ilícito farmacêutico/medicinal.

Palavras-chave: *álcool sem álcool, álcool não registrado, álcool substituto, SARS-CoV-2, COVID-19, Rússia.*

ABSTRACT

Consumption of non-beverage alcohol is an important aspect of hazardous drinking, impacting mortality from various causes of death. Since 2005, non-beverage alcohols in Russia have been the subject of active regulation to control their consumption for drinking. This study was purported to determine whether non-beverage alcohols were available in Russia in 2015–2020 to assess the effectiveness of implemented control policies. During the first wave of the survey between 2015 and 2017, 50 Russian cities of various sizes, types, and locations were surveyed. The second wave was conducted between 2018 and 2020 in 5 cities, which were surveyed during the first wave. Fieldworkers visited various retail outlets and purchased samples of non-beverage alcohols: spirituous liquids with an ethanol content of at least 60% by volume sold at a price of less than 45 roubles per bottle ($0.57, €0.49, £0.44). Up until 2016 various types of non-beverage alcohols known as consumed for drinking were available in retail. The availability of these alcohols differed between cities depending on the level of local enforcement of control regulations. The regulations enacted in response to the 2016 Irkutsk outbreak of mass alcohol poisonings, caused by the consumption of methanol containing fake bath additive “Hawthorn”, removed from the market several types of non-beverage alcohols, significantly reducing their availability since 2017. However, low-cost ethanol sources, such as medicinal tinctures, antiseptics, not denatured eau-de-colognes, remained available in 2017-2020, while new sorts of cheap non-beverage alcohols suitable for drinking were introduced to the market (antiseptics for veterinary use, anti-SARS-CoV-2 hand sanitizers). Illegal alcoholic beverages commonly produced from diverted pharmaceutical/medicinal ethanol were also available in retail networks selling non-beverage alcohols. Since 2005, policies implemented and especially those reinforced and newly enacted in 2017 and later in response to the 2016 Irkutsk outbreak, may have indeed reduced the physical availability of non-beverage alcohols. However, more decisive action is still required to prevent consumption of newly appearing and existing specific sorts of non-beverage alcohols and illegal alcoholic beverages, which are commonly produced from the licit or diverted from the legal market unrecorded illicit pharmaceutical/medicinal ethanol.

Keywords: *non-beverage alcohol, unrecorded alcohol, surrogate alcohol, SARS-CoV-2, COVID-19, Russia*

АННОТАЦИЯ

Употребление непитьевого алкоголя является важным аспектом опасного потребления алкоголя, влияющим на смертность от разных причин. С 2005 года непитьевой алкоголь в России является предметом активного регулирования, направленного на предотвращение его потребления для питья. Целью данного исследования было определение физической доступности непитьевого алкоголя в России в 2015-2020 годах для оценки эффективности предпринятых для его контроля мер. В ходе первого этапа исследования в 2015-2017 годах были обследованы 50 российских городов разного размера, типа и географического расположения. В ходе второго этапа в 2018-2020 годах были обследованы пять городов, исследованных в ходе первого этапа. Полевые работники посещали разнообразные торговые точки и приобретали образцы непитьевого алкоголя: спиртосодержащие жидкости с содержанием этанола не менее 60%, продаваемые по цене менее 45 рублей ($0.57, €0.49, £0.44) за бутылку. До 2016 года различные типы непитьевого алкоголя, известные как употребляемые для питья, были доступны в рознице. Их доступность отличалась в разных городах в зависимости от уровня локального соблюдения законодательных мер по контролю непитьевого алкоголя. Меры, предпринятые в ответ на вспышку массовых алкогольных отравлений в Иркутске в 2016 году, вызванных употреблением метанолсодержащего фальсифицированного концентрата для принятия ванн «Боярышник», убрали с рынка несколько разновидностей непитьевого алкоголя и снизили его физическую доступность с 2017 года. Однако, дешевые источники этанола, такие как медицинские настойки, антисептики, неденатурированные одеколоны, остались доступными в 2017-2020 годах, при одновременном появлении на рынке новых подходящих для питья разновидностей непитьевого алкоголя (антисептики для использования в ветеринарии, анти-SARS-CoV-2 санитайзеры для рук). Нелегальные алкогольные

напитки, часто производимые из фармацевтического/медицинского этанола, были также доступны в розничных сетях, продающих непитьевой алкоголь. Введенные с 2005 года меры контроля непитьевого алкоголя, особенно усиленные и дополненные в 2017 и последующих годах в ответ на вспышку смертельных алкогольных отравлений в 2016 году в Иркутске, могли действительно снизить физическую доступность непитьевого алкоголя. Тем не менее, по-прежнему требуется усиление политики по предотвращению потребления вновь появляющихся на рынке и существующих разновидностей непитьевого алкоголя и нелегальных алкогольных напитков, которые обычно производятся из легального или из выведенного из легального оборота неучтенного фармацевтического/медицинского этанола.

Ключевые слова: *непитьевой алкоголь, незарегистрированный алкоголь, суррогатный алкоголь, SARS-CoV-2, COVID-19, Россия.*

1. INTRODUCTION:

Non-beverage alcohols are industrially produced alcoholic products not intended for drinking but which can be consumed instead of alcoholic beverages. They are most often referred to as “surrogate alcohols” in Russia, not regulated as alcoholic beverages, and can be manufactured legally and illegally. A significant proportion of them is illegal, semi-legal, falsified, or counterfeit alcoholic products as their chemical composition often does not correspond to the chemical composition of legally produced spirituous products (e.g., aftershaves, lotions, eau-de-colognes that do not contain flavoring agents; medicinal tinctures that do not contain extracts of medicinal plants, except ethanol alone) (McKee *et al*. 2005; Gil *et al*., 2018b). Their packaging and consumer properties often make them unsuitable for their intended use, but they make them drinkable.

The most commonly consumed non-beverage alcohols reported in studies include spirituous fake aftershave lotions and perfumes, medicinal tinctures and antiseptics, and concentrated technical ethanol used for a variety of technical purposes in different industries (Gil *et al*., 2018a, Leon *et al*., 2007). Non-beverage alcohols shall be distinguished from the home-brewed alcohols, such as the strong ones as “samogon” (home-brewed in Russia distilled moonshine) and those with low alcohol content as wines and “braga” (home-brewed in Russia not distilled alcoholic drink derived from the fast fermentation of products rich with carbohydrates, with an alcohol concentration below 8%). These alcohols are produced for drinking in contrast to non-beverage alcohols, which are officially produced not for drinking. Non-beverage alcohols in Russia can be sold legally and illegally from various types of retail outlets such as shops of different types and sizes, street kiosks, closed and open markets.

Consumption of non-beverage alcohols for drinking is a long-standing phenomenon in Russia and an important component of the hazardous pattern of drinking impacting mortality from various causes of death (Leon *et al*., 2007; Tomkins et al., 2007; Treml, 1982; Leon *et al*., 2009; Tomkins *et al*., 2012; Andreev *et al*., 2013). In a population-based study conducted in 2003-2005 in the city of Izhevsk, 7% of working-age Russian males consumed non-beverage alcohols for drinking, which was associated with a seven-fold increase in odds of death adjusted for smoking, education, and amount of ethanol consumed from alcoholic beverages (Leon *et al*., 2007).

The main hazard associated with the consumption of non-beverage alcohols is determined by contained in them highly concentrated rectified ethanol (up to 95% by volume) (McKee *et al*., 2005; Rehm *et al*., 2014). However, some sorts of non-beverage alcohols can be more hazardous than the others, as they contain other toxic admixtures in quantities, which raise public health concerns (e.g., diethyl phthalate, polyhexamethyleneguanidine hydrochloride, formic acid, and other substances) (Solodun *et al*., 2011; Gil *et al*., 2018b). Besides this, illegally produced non-beverage alcohols may contain spirits other than ethanol, which are used for their manufacturing (i.e., methanol). Such cases of illegal production regularly manifest in outbreaks of deadly alcohol poisonings. The largest recent outbreak of this sort occurred on 17-26 December 2016 in the Siberian city of Irkutsk, where 123 people were poisoned after drinking fake spirituous bath concentrate “Hawthorn”, of which 78 died (Zobnin *et al*., 2017; Russian Information Agency “TASS”, 2017). The consumption of other methanol-based non-beverage alcohols, such as counterfeit and falsified antifreeze and windshield washer liquids, cause over a thousand sporadically occurring cases of methanol poisoning annually (Neufeld *et al*., 2016; Federal State Statistics Service, 2017).

Several studies reported the misuse of non-beverage alcohol for drinking in recent years

in Russia. A pilot study conducted in 2007 in the city of Novosibirsk reported consumption of industrially produced non-beverage alcohols for drinking by clients of narcology clinic (Bobrova *et al*., 2009). Among respondents of a survey conducted in the Moscow region in 2010, 3.5% consumed non-beverage alcohols, while 12% knew someone who consumed these alcohols as well (Kholdin *et al*., 2014). In a survey of the general population conducted in three regions of Central Russia in 2010-2011, 2.9% of respondents consumed non-beverage spirit, and 0.3% - other surrogate alcohols. However, 14.1%, 7.8%, and 5.0% of respondents knew other people who drank medicinal tinctures, eau-de-colognes/aftershaves, and technical spirits, respectively (Koshkina *et al*., 2013). Interviews of 25 patients of state-run drug and alcohol treatment centers in two Russian cities (Barnaul and Petrozavodsk) in 2013 and 2014 concluded that consumption of unrecorded and non-beverage alcohols remained common among people with alcohol dependence (Neufeld *et al*., 2019). Interview of patients of narcological clinic conducted in the Siberian city of Novosibirsk in 2015 and 2016 identified consumption of diluted industrial alcohol, medicinal spirits, and windshield washer fluids (Neufeld *et al*., 2016). The survey conducted in 2015-2017 in a narcology clinic in the city of Kazan identified consumption of all major types of non-beverage alcohols sold in bottles of various sizes (from 25 ml to 500 ml) by subjects with alcohol and substance use disorders (Gil *et al*., 2018a).

Already back in 2005-2006, Russia tightened legislation targeting non-beverage alcohols with a purpose to control their consumption, and during the following years implemented a range of other control regulations and policies directed at beverage, illegal, and unrecorded alcohols (Gil *et al*., 2009; Gil *et al*., 2016; Neufeld *et al*., 2018; WHO, 2019). The most important policies directed at non-beverage alcohols included the introduction of new denaturing additives (gasoline, kerosene, crotonaldehyde, denatonium benzoate), reducing the volume of a bottle of medicinal tinctures down to 25 ml, set up of The Unified State Automated Information System (EGAIS) for monitoring volumes of produced and distributed alcohol, the introduction in response to 2016 Irkutsk outbreak of alcohol poisonings of series of temporary bans followed by a permanent ban on sales of cheap non-beverage alcohols with an ethanol concentration of more than 28%, strengthening administrative and criminal sanctions for illegal production and distribution of alcohol. However, in spite of all these implemented measures, apart from the documented continued misuse of non-beverage alcohols (Bobrova *et al*., 2009; Koshkina *et al*., 2013; Kholdin *et al*., 2014; Neufeld *et al*., 2016; Zobnin *et al*., 2017; Neufeld *et al*., 2018; Gil *et al*., 2018a), several reports suggested that suitable for drinking non-beverage alcohols may have remained highly physically available. For example, the availability survey conducted in 2007 showed that non-beverage alcohols, such as fake perfumes and medicinal spirits, were readily available immediately after the implementation of 2005-2006 control regulations (Gil *et al*., 2009). A variety of types of used for drinking non-beverage alcohols were available in retail in the Siberian city of Novosibirsk (Neufeld *et al*., 2016). In 2016, the cases of sale for the drinking of a variety of spirituous fake aftershave lotions from vending machines by particularly inventive private entrepreneurs were reported in the city of Saratov (Rossiyskaya Gazeta, 2016). This has suggested the need for conducting a comprehensive assessment of the availability of non-beverage alcohols throughout the country, as it was not sufficiently clear how effectively Russian authorities implemented and reinforced since 2005 policies and regulations adopted for control of various consumed for drinking types of non-beverage alcohols, and what particular types of non-beverage alcohols remained available till 2020. Of particular interest was the assessment of the availability of suitable for drinking antiseptics, given the upsurge in their production in 2020 in Russia caused by the SARS-CoV-2-pandemic. To address these questions, between 2015 and 2020 a survey of the availability of non-beverage alcohols in cities across Russia was conducted, the results of which are presented in this report.

2. MATERIALS AND METHODS:

The availability survey consisted of two waves. The first wave was originally planned for 2015 and 2016. However, due to the event of a deadly outbreak of mass alcohol poisonings caused by consumption of the methanol-containing non-beverage alcohol in the city of Irkutsk in 2016 (Zobnin *et al*., 2017), which forced authorities to implement specific restrictive regulations targeting non-beverage alcohols (WHO, 2019), the first wave of the survey was extended up to 2017. This allowed assessing the immediate effects of regulations introduced in response to the Irkutsk outbreak.

As it was sought to achieve high geographical coverage of the Russian Federation, the first wave of the availability survey was

conducted in 50 Russian cities situated in different geographic and climatic zones in all 8 Federal Districts of the country. For example, the surveyed cities included the largest westernmost and easternmost cities of Kaliningrad and Petropavlovsk-Kamchatsky, the largest northernmost city of Murmansk located beyond the Arctic Circle, and the southernmost subtropical city of Sochi. The cities also spanned all types and sizes, from the smallest ones, such as Petushki (13 620 residents) to the biggest metropolis of Moscow (over 12 mln residents) (Figure 1).

The second wave of availability survey was conducted between 2018 and 2020 in five Russian cities, which were surveyed during the first wave of this survey. Data obtained from both waves were sufficient to evaluate from the availability perspective the effectiveness of policies implemented for control of non-beverage alcohols between 2005 and 2020.

More specifically, the availability survey pursuit three objectives: 1) to determine whether non-beverage alcohols were still available in retail in the cities of the Russian Federation in 2015-2020, 2) to provide characteristics of different types of non-beverage alcohols that were sold, and 3) to assess the effectiveness of policy measures adopted for control of non-beverage alcohols since 2005.

To achieve stated objectives, during the first wave of the survey (2015-2017), fieldworkers were instructed to visit at least 10 retail outlets of different types in each surveyed city, purchase samples of non-beverage alcohols, and spend on this work no more than 12 hours of time. The non-beverage alcohols were defined as the manufactured alcohol-containing liquids not intended for consumption instead of alcoholic beverages, and not classed as alcoholic drinks, but which may be consumed for drinking. They were typically at least 60% by volume ethanol (as indicated on the bottle label) and cost less than 45 roubles ($0.57, €0.49, £0.44) per bottle. Purchased samples of non-beverage alcohols were compared with the types of non-beverage alcohols obtained during the previous availability survey (Gil *et al*., 2009), and with those reported to have been consumed for drinking by subjects with alcohol and substance use disorders in the narcology survey in the city of Kazan, which was conducted simultaneously with the first wave of availability survey (Gil et al., 2018a). The samples of non-beverage alcohols, which were sold in retail before the Irkutsk outbreak (in 2015 and 2016), were compared with those available after the outbreak (in 2017 and later).

The second wave of availability survey (2018-2020) consisted of short surveys of availability with control purchases of non-beverage alcohols in 5 Russian cities in 2018 (Odintsovo, Moscow), 2019 (Izhevsk, Chelyabinsk), and 2020 (Moscow, Petushki, Chelyabinsk). Fieldworkers visited 1-3 retail outlets in which non-beverage alcohols were sold during the first wave of the survey, and 1-2 new previously not visited outlets.

In both waves of the survey, fieldworkers were also asked to purchase samples of illegal alcoholic beverages if they found them in the outlets they visited. This was done after a fieldworker discovered illegal vodka at one of such outlets. This allowed us to compare the unit cost of ethanol (measured as the cost of 10 ml of pure ethanol) in illegal beverages with that in non-beverage alcohols and draw inferences about the availability and control of illegal alcoholic beverages.

The information on purchased samples of non-beverage alcohols was recorded on paper proformas, photographed, collated centrally, and entered into the SPSS database. The analysis included a descriptive statistical analysis with the estimation of proportions, means, medians, and interquartile ranges for continuous variables describing characteristics of purchased samples. The econometric analysis included estimation and comparison of the cost of a unit of ethanol in non-beverage alcohols with that in legal and illegal alcoholic beverages. All analyses were conducted in SPSS for Windows, v.21 (SPSS, Inc., Chicago, IL).

3. RESULTS AND DISCUSSION:

3.1. Availability of non-beverage alcohols in 2015-2017

During the first wave of the availability survey, 884 retail outlets were visited in 50 cities situated in 35 regions of the Russian Federation, from which 2245 samples of non-beverage alcohols were purchased. In each surveyed city, this study was able to purchase non-beverage alcohols meeting availability survey criteria. A slightly larger number of outlets at any given year was visited in the outlying areas of the cities (54-58%). About half of the visited outlets were pharmacies (54-57%); others were street kiosks (8-11%), cosmetics and domestic chemistry shops (7-9%), supermarkets (8-9%), grocery stores (5-8%), markets (5-6%), and home appliances shops (1-3%). About half of the visited retail outlets at any

given year sold at least one alcoholic product with a minimum concentration of ethanol by volume of 60% (e.g., 154 of 303 outlets for 2015) (Table 1). The majority of these outlets (e.g., 123 of 137 outlets for 2016) sold non-beverage alcohols with ethanol unit cost lower than that in the cheapest legal vodka (<9.25, <9.5, and <10.25 Russian roubles per 10 ml pure ethanol for 2015, 2016, and 2017, respectively). An even greater proportion of these outlets sold products, known to be used for drinking (e.g., 127 of 132 outlets for 2017). From the 154, 137, and 132 outlets selling non-beverage alcohols, information was obtained on 709, 661, and 766 samples of non-beverage alcohols corresponding to availability survey criteria, in 2015, 2016, and 2017, respectively (Table 1). Data by the city is presented in Tables 7 and 8.

As shown in Table 2, all major types of non-beverage alcohols, which have been reported in Kazan narcology survey as being consumed for drinking (Gil *et al*., 2018a), were purchased, except for spirituous window cleansers and anti-icers. The identified in retail samples of window cleansers and anti-icers were deliberately not purchased. Their cost per bottle by far exceeded the selected survey price threshold of 45 roubles; they were sold in larger bottles (e.g., 0.5L or larger), were not ethanol-based (according to information on bottle labels). Hence, it was unlikely that they were consumed for drinking.

Bottle size of the majority of purchased samples varied between 25 ml and 100 ml. 17 samples were purchased in bottles larger than 100 ml. Among them were food flavor enhancers, which came in 0.5 L bottles. Prices ranged from 6 to 103 roubles per bottle (median 21.9; IQR 14.3). 62.1% (1326/2136) of all samples purchased between 2015 and 2017 had a unit cost of ethanol below than that in the legal standard Russian vodka, and 28.7% (613/2136) had a unit cost of ethanol below than that in illegal vodka (Tables 3-6).

3.1.1 Non-beverage alcohols available in 2015 and 2016 (before Irkutsk outbreak)

The available in 2015 and 2016 non-beverage alcohols included the following types: (1) perfumery and cosmetics spirituous liquids (lotions, tonics, eau-de-colognes, concentrates for taking a bath), (2) medicinal spirits (tinctures, solutions for internal use, antiseptics, medicinal ethanol), (3) technical and household chemistry spirituous liquids (technical spirit/ethanol, non-medicinal antiseptics), (4) spirituous liquids for oral hygiene, (5) spirituous food flavor enhancers (Table 2).

Medicinal tinctures sold in 25 ml bottles were the most common type of non-beverage alcohol available, followed by fake cosmetic lotions, tonics, and eau-de-colognes. The largest number of non-beverage alcohols was provided by pharmacies (mainly tinctures in 25 ml, 40 ml, 100 ml bottles, and antiseptics in 50 ml and 100 ml bottles). Other main sources of non-beverage alcohols were street kiosks, cosmetics, and domestic chemistry shops (Tables 3-6).

The current survey was able to buy the same types of non-beverage alcoholic products, which were purchased in the previous availability survey in 2007 (Gil *et al*., 2009). The most illustrative examples of purchased non-beverage alcohols with their characteristics are shown in Figure 2. However, compared with the previous survey, a new type of non-beverage alcohol was identified in 2015 and 2016. It was industrially manufactured spirituous food flavor enhancers with a low unit cost of ethanol, the consumption of which for drinking was reported in Kazan narcology survey (Figure 3).

3.1.2 Non-beverage alcohols available in 2017 (after Irkutsk outbreak)

In 2017, the fieldworkers could no longer purchase a range of types and brand names of non-beverage alcohols because they were removed from the market. They were spirituous liquids for oral and body hygiene, concentrates on taking a bath, food flavor enhancers, specific sorts of non-medicinal antiseptics, and the most commonly consumed for drinking types of perfumery cosmetics liquids, such as the cheap spirituous fake aftershave and cosmetic lotions, and tonics. However, medicinal tinctures in 25 ml, 40 ml, and 100 ml bottles, medicinal spirituous solutions for internal use (e.g., Limanovit, 100 ml bottle), medicinal antiseptics (e.g., Formic Spirit, 50 ml and 100 ml bottles), and cheap not denatured eau-de-colognes (e.g., Troynoy, Shipr) were still available in 2017 (Tables 2-6). In 2017, a new type of non-beverage alcohol – the spirituous antiseptic for veterinary use “StopSept” (low unit cost of ethanol, 100 ml bottle) appeared on the market (Figure 2).

In 2017, pharmacies became almost the only providers of the legally allowed for sale non-beverage alcohols containing cheap ethanol (97.8% of all purchased samples). However, in 2017, the 42 samples of non-beverage alcohols with a low unit cost of ethanol (13.2% of all purchased in 2017 samples with cheaper than in vodka ethanol) were nevertheless purchased, which were prohibited for sale after the Irkutsk outbreak, the majority of which (39 samples) were

not denatured eau-de-colognes. They were purchased in a variety of types of retail outlets (Table 6).

3.2. Availability of non-beverage alcohols in 2018-2020

During the second wave of the availability survey, 27 retail outlets selling non-beverage alcohols were visited in five surveyed cities: 16 pharmacies, 4 small shops/kiosks/pavilions, 5 open and closed markets, 2 supermarkets. From these outlets, 126 samples of non-beverage alcohols were purchased: 78 medicinal tinctures/extracts/solutions for internal use, 14 medicinal antiseptics, 3 antiseptics for veterinary use, 2 bottles of medicinal ethanol, 6 denatured and 18 not denatured eau-de-colognes, 2 not denatured lotions, 1 fake cosmetic tonic, and 2 spirituous sanitizers for hand disinfection (appeared on the market in 2020 during the first months of the SARS-CoV-2 pandemic (Figure 4)). 63.5% of the purchased samples were of sorts reported as drunk by subjects with alcohol and substance use disorders in the narcology survey (Gil *et al*., 2018a). 9 retail outlets visited were selling non-beverage alcohols used for drinking round-the-clock (24 hours a day).

3.3. Illegal alcoholic beverages

In five surveyed cities, fieldworkers identified and purchased 23 samples of illegal alcoholic beverages. The prices per 0.5L bottle of the cheapest illegal vodka ranged from 110 roubles ($1.76, €1.51, £1.32) in 2015 to 150 roubles ($2.05, €1.69, £1.55) in 2020. Eight retail outlets selling illegal alcoholic beverages were also selling nonbeverage alcohols known as consumed for drinking.

All samples of illegal beverages were purchased at prices, which were 1.5-3 times lower than the minimum prices established by the state for different alcoholic beverages. The cost of the cheapest illegal vodka was used to compare the unit cost of ethanol in illegal vodka and non-beverage alcohols. The typical samples of illegal alcoholic beverages, purchased in this survey, are presented in Figures 5 and 6.

3.4. Cost of a unit of ethanol in non-beverage alcohols

In 2015 and 2016, the majority of purchased samples of non-beverage alcohols with a minimum ethanol concentration of 60% by volume had ethanol unit cost lower than that in legal vodka (e.g., 78.3% (555/709) in 2015). However, in 2017 this proportion significantly dropped to 41.6% (319/766). The greatest proportions of non-beverage alcohols with a low unit cost of ethanol were among types prohibited for sale since 2017: 100%, 97.7%, and 91.3%; and 65.5%, 43.5%, and 47.9% in comparison with legal and illegal vodka for 2015, 2016, and 2017, respectively (Table 4).

The mean unit cost of ethanol in non-beverage alcohols sold in larger bottles was lower than that of legal and illegal vodka in 2015 and 2016. However, in 2017, it was practically equal to the mean unit cost of ethanol in illegal vodka but was still lower than in legal vodka. (Figure 7 A, B, C).

In 2015, all purchased samples of the major types of non-beverage alcohols (with the exception of proportion of medicinal tinctures, extracts, and solutions for internal use) contained ethanol, which was cheaper than in legal vodka. However, in 2017, the largest proportions of samples (over 80%) with a low unit cost of ethanol were identified mainly among antiseptics and eau-de-colognes, and in a few purchased samples of banned in 2017, hence illegal, fake lotions. The same types of non-beverage alcohols, which were reported as consumed for drinking in the Kazan narcology survey, provided high proportions of samples with cheap ethanol in 2017 (Figure 7 D).

By 2017, the proportion of samples with cheap ethanol, among all purchased samples, reduced for all volumes of bottles. However, it still remained very high (≈80% and higher) for non-beverage alcohols, which came in 80-100 ml bottles, and especially which were reported as consumed for drinking in the Kazan narcology survey (Figure 7 E). In 2017, the greatest proportions of samples with cheap ethanol were in non-beverage alcohols, which were not prohibited for sale after the Irkutsk outbreak and came in 99-100 ml bottles (more than 90% of samples) (Figure 7 F). These were mainly medicinal tinctures, antiseptics, and cheap, not denatured eau-de-colognes.

In 2018-2020, 57.9% of all purchased samples and 78.3% of samples of non-beverage alcohols known as misused for drinking had a cost of the unit of ethanol below that of standard 0.5L legal Russian vodka sold at established by the state minimum price. 34.6% of samples of medicinal tinctures/extracts/spirituous solutions for internal use, 91.7% of eau-de-colognes, and all samples of other types of non-beverage alcohols had a cost of a unit of ethanol below that of legal vodka. A greater percentage of tinctures and colognes, known as consumed for drinking, had cheaper ethanol than in legal vodka: 54.1% and

95.5%, respectively (Figure 8 A).

In comparison with illegal vodka, 34.1% of all purchased samples and 49.4% of samples of alcohols reported as drunk had a cheaper unit cost of ethanol. Among all samples, 14.1% of medicinal tinctures/extracts/solutions for internal use, 33.3% of cosmetic lotions/tonics, 58.3% of colognes, 71.4% of medicinal antiseptics, and all samples of other types of non-beverage alcohols contained a unit of ethanol with a cost below that of illegal vodka. Among alcohols known as drunk, 24.3% of medicinal tinctures, 33.3% of cosmetic lotions/tonics, 63.6% of colognes, 71.4% of medicinal antiseptics, and all samples of the remaining types of non-beverage alcohols had cheaper than in illegal vodka unit of ethanol (Figure 8 B).

The majority of non-beverage alcohols sold in larger bottles had cheaper ethanol in comparison with legal and illegal vodka. 54.8% and 19.4% of medicinal tinctures sold in 25 ml bottles contained a cheaper unit of ethanol than that of legal and illegal vodka, respectively (Figure 8 C, D).

Interestingly enough, for some of the medical antiseptics purchased after the start of the SARS-CoV-2 pandemic in 2020, the cost of a unit of ethanol rose sharply due to a substantial increase in retail prices on antiseptics (e.g., antiseptic “Aseptolin”). While for other sorts of antiseptics, the retail prices and the cost of a unit of ethanol remained low (e.g., “Formic Spirit”). In addition, the new antiseptic with a low cost of a unit of ethanol appeared on sale during the first months of the SARS-CoV-2 pandemic (“hand tonic Ethyl Alpha", 99 ml, 95% ethanol by volume) (Figures 2 and 4).

3.5. Gaps in the legal regulation of non-beverage alcohols

Results of the survey obtained till 2016 go in agreement with previous availability survey (Gil *et al*., 2009), and with other studies, carried between 2010 and 2016, reporting various sorts of available in retail consumed for drinking non-beverage alcohols in some of the cities in which the presented in this paper availability survey was conducted (Novosibirsk, Barnaul, Moscow) (Koshkina *et al*., 2013; Neufeld *et al*., 2016; Neufeld *et al*., 2019). This suggests reduced quality, problems with implementation and loopholes in the regulation of non-beverage alcohols during the period under analysis.

Identified in the survey low cost per single bottle, the low unit cost of ethanol in comparison with that in legal and illegal alcoholic beverages of significant proportions of available in retail non-beverage alcohols suggest insufficient use and enforcement of policies, which can reduce the affordability of these spirituous products (e.g., taxation, minimum prices). A number of studies and reports point to the significant role of economic considerations in decisions about consuming various alcohols (Gil *et al*., 2016; Kotelnikova *et al*., 2017; Gil *et al*., 2018a; Shield *et al*., 2019). For example, for consumers of non-beverage alcohols, the cost per unit of ethanol is important and the cost of an individual bottle of alcohol. The very low cost per bottle of some sorts of medicinal tinctures sold in 25 ml bottles (from 9 rubles or $0.1, €0.1, £0.09 per bottle in 2020), for instance, may explain their continued use for drinking when a consumer can derive an equivalent of 200 ml of vodka from four such bottles at a time at a very low cost (36 roubles).

In 2017 and later, the Russian Agency ”Rospotrebnadzor” (The Federal Agency for Consumer Rights and Health Protection), triggered by the 2016 Irkutsk outbreak of poisonings, introduced bans on the sale of a range of cheap non-beverage alcohols. As a result, according to data of this survey, a variety of types and brand names of fake perfumes, concentrates for taking bath, non-medicinal antiseptics, and food flavor enhancers have entirely or almost entirely disappeared from the market. However, cheap medicinal alcohols (tinctures and medicinal antiseptics), sold in pharmacies, and cheap, not denatured eau-de-colognes remained available.

The continued availability of medicinal spirits can be explained by the fact that they are regulated by another Russian agency named ”Roszdravnadzor” (The Federal Service for Surveillance in Healthcare). Hence, the regulations and provisions enacted by the Rospotrebnadzor agency are not applied to medicinal alcohols. Besides it, the Russian Federation has not yet introduced minimum prices for the pharmaceutical/medicinal ethanol as it did for the non-medicinal ethanol to discourage production and consumption of non-beverage alcoholic products, illegal and unrecorded alcohol. This still makes extremely profitable to use the low-cost raw pharmaceutical/medicinal ethanol for the production of consumed for drinking legal non-beverage medicinal alcohols (tinctures, extracts, antiseptics), legal, semi-legal, and illegal non-beverage non-medicinal alcohols (real and fake perfumes, antiseptics, bath additives), and unrecorded illegal alcoholic beverages.

Since 2017, Russia has included crude pharmaceutical/medicinal ethanol in the federal

system for monitoring volumes of alcohol produced, which is called the “EGAIS monitoring system”. However, the sale of end non-beverage alcoholic products manufactured from this ethanol is still not covered by this system, making the diversion of raw pharmaceutical/medicinal ethanol into the production of a variety of unrecorded alcohols invisible to the state. It is important to note that some of the manufacturers of pharmaceutical/medicinal ethanol and non-beverage alcohols produced from this ethanol in Russia are the large-scale businesses capable of influencing the alcohol policy-making process.

In 2017 this survey purchased the newly appeared on the market antiseptic for veterinary use “StopSept” sold in 100 ml bottles with a cheap unit cost of ethanol, which was produced from the pharmaceutical/medicinal ethanol by one of the largest pharmaceutical manufacturers infamous for its “Hawthorn” tincture business (Figure 2). This antiseptic was invented after an earlier enacted poorly observed order of the Roszdravnadzor agency was enforced in response to the 2016 Irkutsk outbreak, restricting the production and sale of medicinal non-beverage alcohols in bottles larger than 25 ml by volume. Thus, in order to exclude the best-selling non-beverage alcohols produced for human use in 100 ml bottles from this restrictive regulation, this antiseptic, intended for veterinary (but not human) use, made it possible to continue selling cheap non-beverage ethanol for drinking, which has previously been sold under the brands of hawthorn and other medicinal tinctures that came in 100 ml bottles.

In 2018-2020, due to the continued supply of cheap pharmaceutical/medicinal ethanol, the consumed for drinking medicinal spirits (tinctures, extracts, antiseptics) with a low unit cost of ethanol were readily available in pharmacies. Also, in 2018-2020 the cheap non-medicinal (veterinary) antiseptics, medicinal ethanol, and spirituous hand sanitizers were identified to have been sold in small street shops/pavilions/kiosks, although the number of such points of sale, according to observations of fieldworkers, was small in comparison with pharmacies selling legal tinctures and medicinal antiseptics.

Particular attention deserves the situation around antiseptics during the 2020 SARS-CoV-2 pandemic. According to data of this availability survey, the pandemic affected certain brands of medicinal antiseptics (e.g., antiseptic “Aseptolin”) in a way that their prices skyrocketed due to the huge demand for them among the general population, which began to actively use them as hand and surface disinfectants. This made them unaffordable to certain population groups, who drunk them before the SARS-CoV-2 pandemic. However, the prices for other medicinal antiseptics, which were also previously used for drinking and were sold in pharmacies, have remained low, which has left them still affordable for surrogate alcohol drinkers (e.g., Formic Spirit). In addition, since no immediate control regulations were put in place for the restriction of cheap antiseptics, the new not denatured anti-SARS-CoV-2 hand sanitizers with a low unit cost of ethanol appeared on the market. They were sold in small street shops in bottles that don’t prevent their consumption for drinking (“hand tonic Ethyl Alpha", 99 ml, 95% ethanol by volume) (Figure 4).

Purchased in this availability survey samples of illegal falsified alcoholic beverages were also likely produced from the diverted pharmaceutical/medicinal ethanol because the latter during the past several years has been the cheapest source of the raw ethanol in Russia.

Apart from the regulatory loopholes and insufficiencies in implementing control policies described above, other gaps in the regulation of non-beverage alcohols may explain their continued availability through 2020. The policies implemented over recent decades for control of unrecorded, surrogate, and non-beverage alcohols are well summarised by WHO (WHO, 2019). Our analysis of the current, newly enacted, and amended since 2005 regulations targeting non-beverage alcohols revealed problems with their quality, diversity of provided control policies, the timing of their implementation, and the overall organization of the alcohol policy-making process (Gil *et al*., 2020). Among the major gaps, which shall be noted are the following: 1) limited range and fragmentary implementation of control policies (e.g. minimum prices were introduced only for non-medicinal non-beverage alcohols making medicinal/pharmaceutical spirits the cheapest sources of ethanol; underutilization of separate excise taxes on all different types of non-beverage alcohols), 2) lack of harmonization and discrepancies between different orders and decrees (e.g. while one order banned medicinal tinctures in larger bottles (>25 ml of volume), another decree allowed their registration for production and sale in bottles up to 100 ml of volume), 3) poor enforcement (e.g. continued until 2017 sale of fake spirituous perfumes and other specific types of non-beverage alcohols in spite of the implemented control policies in 2005-2006; existence of a sizable market of counterfeit methanol-based windshield washer and antifreeze liquids despite a legal ban on their production and

sale), 4) recommendatory nature of some regulations (e.g. denaturing is recommended, but not obligatory), 5) delayed implementation of effective policies (e.g. ban on the sale of fake perfumes, non-medicinal antiseptics, and spirituous food flavor enhancers was implemented only after the large scale outbreak of alcohol poisonings in Irkutsk in 2016, while previous smaller-scale outbreaks caused by consumption of these products were ignored), 6) implementation of partially effective regulations in isolation from other effective policies, which could have been enacted simultaneously (e.g. introduction of the very small bottle size of 25 ml of volume for the medicinal tinctures without implementing minimum prices on them or on raw pharmaceutical/medicinal ethanol hasn't completely prevented their consumption for drinking (Gil *et al*., 2018a)), 7) overall lack of coordination and harmonization between different state agencies responsible for the control of non-beverage alcohols (e.g. while one agency effectively suppressed the consumption of fake spirituous perfumes, food flavor enhancers, and non-medicinal antiseptics, another agency responsible for medicinal spirits hasn't done that, having switched non-beverage alcohol drinkers to the predominant consumption of medicinal spirits), 8) the ambiguity of texts of some orders and decrees, which allows them to be interpreted in several often opposite and contradicting ways, and other gaps.

This study has a limitation, which shall be noted. The surveyed retail outlets in cities are not a representative sample of all outlets in a given city or country. Hence, the distribution of surveyed outlets by type and purchased alcohols by their varieties may reflect the survey patterns specific to individual field workers. However, the analysis of these distributions did not reveal significant differences between the fieldworkers. In contrast, differences were found in distributing the types of outlets visited and the types of alcohol samples purchased between different cities surveyed by the same field worker. Given that several fieldworkers surveyed several cities they have never visited before, this variation may, in fact, indicate a different situation with non-beverage alcohol availability in different cities. For example, in Arkhangelsk in 2016, a fieldworker visited 5 street kiosks, where purchased 11 samples of various consumed for drinking fake spirituous lotions, aftershaves, and bath additives. However, the same fieldworker in the same year in the city of Petrozavodsk (has a size comparable to that of Arkhangelsk) examined only 1 street kiosk, where purchased only 1 sample of a cheap not denatured eau-de-cologne. According to the observations of this fieldworker, non-beverage alcohols were more readily available in Arkhangelsk since the retail outlets selling them were encountered much more frequently along the way during the survey than in Petrozavodsk. According to the same fieldworker, non-beverage alcohols and outlets where they were sold were more common, for example, in such cities as Murmansk, Novosibirsk, and Vologda, and less common in Tyumen, Salekhard, and Pitkaranta. Other fieldworkers who surveyed several other cities they had never visited before also reported that the availability of non-beverage alcohols could differ significantly between cities, which may reflect varying degrees of enforcement of enacted regulations, hence regional variations in the implementation of control policies targeting non-beverage alcohols.

4. CONCLUSIONS:

The survey results showed that the wide variety of consumed for drinking non-beverage alcohols was readily available up untill 2016 – after a decade-long period of their targeted regulation. In 2017 and later, large segments of non-beverage alcohols represented by fake spirituous perfumes and hygienic liquids (aftershaves, lotions, tonics, bath additives, spirituous liquids for oral and body hygiene), cheap non-medicinal antiseptics, and spirituous food flavor enhancers were removed from the market. This was done by reinforcement of the previously implemented restrictive regulations and enacting the new bans in response to the 2016 Irkutsk outbreak of mass alcohol poisoning caused by consumption of methanol containing non-beverage alcohol. However, a range of consumed for drinking non-beverage alcohols remained available in retail up until 2020. They included a large segment of alcohols produced from the pharmaceutical/medicinal ethanol such as the medicinal alcohols (tinctures, extracts, solutions for internal use, antiseptics, medicinal ethanol), antiseptics for veterinary use, and cheap not denatured real and fake eau-de-colognes. In addition to them, the cheap used for drinking spirituous hand sanitizers/antiseptics invented by producers of surrogate alcohols were introduced to the market during the SARS-CoV-2 pandemic.

While policies and regulations implemented since 2005, and especially those reinforced and newly enacted in response to the 2016 Irkutsk outbreak, may have indeed significantly reduced the physical availability of non-beverage alcohols, stronger action is still required in Russia to prevent the consumption of

the newly apprearing and existing specific sorts of non-beverage alcohols, as well as illegal alcoholic beverages, which are often produced from the low-cost legal and illegal diverted from the official production pharmaceutical/medicinal ethanol.

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Table 1. *Availability of non-beverage alcohols in retail in 50 Russian cities, 2015-2017, (n)*

			Year 2015	2016	2017
Number of items 60% or more ethanol purchased	**Total**		709	661	766
	Items prohibited for sale since 2017		162	190	55
	Medicinal tinctures	**25 ml**	387	380	583
		40 ml	62	55	69
		100 ml*	51	17	14
Number of retail outlets	**Visited**		303	285	296
	Selling products 60% or more ethanol		154	137	132
	Selling products with unit cost < legal vodka		147	123	112
	Selling products reported as drunk in Kazan**		153	127	127
	Selling products prohibited for sale since 2017		55	58	26
	Selling medicinal tinctures	**25 ml**	100	78	104
		40 ml	62	53	69
		100 ml*	22	14	10

** including medicinal spirituous solutions for internal use, regulated as medicinal tinctures, sold in 100 ml bottles (e.g. Limanovit);*

*** selling non-beverage alcoholic products, which were reported by subjects with alcohol and substance use disorders as consumed for drinking (Gil et al., 2018a); some of the similar sorts of non-beverage alcohols were reported consumed for drinking in other studies as well (Bobrova et al., 2009; Koshkina et al., 2013; Kholdin et al., 2014; Neufeld et al., 2016; Zobnin et al., 2017; Neufeld et al., 2018).*

Table 2. *Main types of manufactured non-beverage alcohols reported as drunk by patients of narcology clinic, and the number and characteristics of these alcohols purchased in the survey of availability in 50 Russian cities in 2015-2017, (n)*

Narcology survey in Kazan		Availability survey in 50 cities						
Type of non-beverage alcohol*		n of narco-logy pati-ents**	Number of samples purchased				% ethanol by volume***	Volume of bottle (ml)***
			Total	2015	2016	2017		
I. Perfumery and cosmetics spirituous liquids	**Lotions/ aftershaves**	190	118	53	62	3	25; 30; 40; 68; 70; 75; 95	99; 100; 250
	Tonics	33	27	19	8	0	75; 80	100
	Eau-de-colognes	34	114	38	44	32	60; 64; 75; 75.7; 79.5	80; 83; 85; 86; 99; 100
	Bath concentrates	51	3	2	1	0	75; 93	250
II. Medicinal spirituous liquids	**Medicinal tinctures#**	135 17 80	64 190 740	35 62 257	17 56 202	12 72 281	70; 90 70 70; 90	100 40 25
	Solutions for internal use	8	16	14	0	2	95	100
	Antiseptics	35	103	46	17	40	70; 90	50; 100
	Medicinal ethanol	3	2	1	1	0	95	100
III. Technical and household chemistry spirituous liquids	**Technical ethanol**	71	0	0	0	0	95	100
	Antiseptics	1	1	0	1	0	85	300
	Anti-icers	2	0	0	0	0	-	-
	Window cleansers	5	0	0	0	0	-	-
IV. Spirituous liquids for oral hygiene		1	6	5	1	0	60	100
V. Spirituous food flavour enhancers		5	9	3	4	0	45	500

** non-beverage alcoholic products, which were reported by subjects with alcohol and substance use disorders as consumed for drinking (Gil et al., 2018a); some of the similar sorts of non-beverage alcohols were reported consumed for drinking in other studies as well (Bobrova et al., 2009; Koshkina et al., 2013; Kholdin et al., 2014; Neufeld et al., 2016; Zobnin et al., 2017; Neufeld et al., 2018);*

*** denominator for the percentages are 165 narcology patients who reported to have drunk non-beverage alcohols in the previous year (Gil et al., 2018a);*

****as stated on the bottle label;*

 # in the narcology survey, we specifically asked survey participants to indicate the volume of a bottle of medicinal tinctures consumed for drinking in order to assess the effectiveness of regulations providing for reducing the volume of a bottle of medicinal tinctures down to 25 ml, aimed at preventing their consumption for drinking (Gil et al., 2018a).

Table 3. *Characteristics of all purchased and reported as consumed for drinking non-beverage alcohols identified with minimum ethanol concentration of 60% by volume, 50 Russian cities, 2015-2017, (n (%))*

	All non-beverage alcohols			Reported as drunk in Kazan narcology survey		
	2015	2016	2017	2015	2016	2017
Place of purchase within city						
Center	296 (41.7)	297 (44.9)	346 (45.2)	222 (41.9)	183 (44.4)	190 (43.3)
Outlying area	413 (58.3)	364 (55.1)	420 (54.8)	308 (58.1)	229 (55.6)	249 (56.7)
Type of retail outlet						
Pharmacy	554 (78.1)	477 (72.2)	710 (92.7)	421 (79.4)	297 (72.1)	408 (92.9)
Kiosk	56 (7.9)	42 (6.4)	5 (0.6)	45 (8.5)	32 (7.8)	1 (0.2)
Open market	9 (1.3)	14 (2.1)	9 (1.2)	8 (1.5)	12 (2.9)	6 (1.4)
Covered market	26 (3.7)	14 (2.1)	12 (1.6)	14 (2.6)	11 (2.7)	10 (2.3)
Cosmetics/domestic chemistry shop	43 (6.1)	80 (12.1)	18 (2.3)	24 (4.5)	38 (9.2)	10 (2.3)
Supermarket	4 (0.6)	7 (1.1)	1 (0.1)	4 (0.8)	6 (1.5)	1 (0.2)
Home appliances shop	15 (2.1)	12 (1.8)	11 (1.4)	12 (2.3)	3 (0.7)	3 (0.7)
Grocery store	2 (0.3)	15 (2.3)	0 (0)	2 (0.4)	13 (3.2)	0 (0)
Type of non-beverage alcohol						
Medicinal tincture	501 (70.7)	453 (68.5)	676 (88.3)	368 (69.4)	274 (66.5)	372 (84.7)
Cosmetic lotion/tonic	80 (11.3)	84 (12.7)	2 (0.3)	71 (13.4)	72 (17.5)	1 (0.2)
Eau-de-cologne	74 (10.4)	102 (15.4)	52 (6.8)	37 (7.0)	45 (10.9)	31 (7.1)
Antiseptic	46 (6.5)	18 (2.7)	36 (4.7)	46 (8.7)	18 (4.4)	35 (8.0)
Liquids for body or oral hygiene	5 (0.7)	2 (0.3)	0 (0)	5 (0.9)	2 (0.5)	0 (0)
Bath concentrates	2 (0.3)	0 (0)	0 (0)	2 (0.4)	0 (0)	0 (0)
Other	1 (0.1)	2 (0.3)	0 (0)	1 (0.2)	1 (0.2)	0 (0)
Bottle size (ml)						
25	387 (54.6)	380 (57.5)	583 (76.1)	257 (48.5)	202 (49.0)	284 (64.7)
40	62 (8.7)	55 (8.3)	69 (9.0)	62 (11.7)	55 (13.3)	69 (15.7)
50	17 (2.4)	8 (1.2)	37 (4.8)	16 (3.0)	6 (1.5)	32 (7.3)
80-98	49 (6.9)	79 (12.0)	29 (3.8)	12 (2.3)	23 (5.6)	9 (2.1)
99-100	190 (26.8)	133 (20.1)	48 (6.3)	179 (33.8)	124 (30.1)	45 (10.3)
>100	4 (0.6)	6 (0.9)	0 (0)	4 (0.8)	2 (0.5)	0 (0)
Bottle price (roubles)						
<10.00	62 (8.7)	36 (5.5)	5 (0.7)	60 (11.3)	26 (6.3)	3 (0.7)
10.00-19.99	301 (42.5)	224 (33.9)	215 (28.1)	224 (42.3)	158 (38.3)	165 (37.6)
20.00-29.99	250 (35.3)	188 (28.4)	233 (30.4)	181 (34.2)	128 (31.1)	142 (32.3)
30.00-39.99	85 (12.0)	100 (15.1)	169 (22.1)	57 (10.8)	47 (11.4)	76 (17.3)
≥40.00	11 (1.6)	113 (17.1)	144 (18.8)	8 (1.5)	53 (12.9)	53 (12.1)
Ethanol concentration (% by volume)						
60.0-69.9	78 (11.0)	93 (14.1)	43 (5.6)	41 (7.7)	50 (12.1)	27 (6.2)
70.0-79.9	486 (68.5)	431 (65.2)	515 (67.2)	412 (77.7)	326 (79.1)	357 (81.3)
80.0-89.9	25 (3.5)	46 (7.0)	63 (8.2)	1 (0.2)	1 (0.2)	0 (0)
90.0+	120 (16.9)	91 (13.8)	145 (18.9)	76 (14.3)	35 (8.5)	55 (12.5)
Unit cost per 10 ml pure ethanol (roubles)						
<3.00	88 (12.4)	37 (5.6)	4 (0.5)	84 (15.8)	31 (7.5)	4 (0.9)
3.00-5.99	249 (35.1)	175 (26.5)	74 (9.7)	203 (38.3)	130 (31.6)	67 (15.3)
6.00-8.99	200 (28.2)	217 (32.8)	186 (24.3)	150 (28.3)	147 (35.7)	129 (29.4)
≥9.00	172 (24.3)	232 (35.1)	502 (65.5)	93 (17.5)	104 (25.2)	239 (54.4)
Unit cost per 10 ml pure ethanol in comparison with that in standard 0.5L bottle of legal Russian vodka sold at minimum established by the state price						
Cheaper	555 (78.3)	452 (68.4)	319 (41.6)	451 (85.1)	319 (77.4)	238 (54.2)
More expensive	154 (21.7)	207 (31.3)	447 (58.4)	79 (14.9)	92 (22.3)	201 (45.8)
The same	0 (0)	2 (0.3)	0 (0)	0 (0)	1 (0.1)	0 (0)
Unit cost per 10 ml pure ethanol in comparison with that in illegal 0.5L bottle of vodka*						
Cheaper	300 (42.3)	212 (32.1)	101 (13.2)	254 (47.9)	161 (39.1)	92 (21.0)
More expensive	409 (57.7)	448 (67.8)	665 (86.8)	276 (52.1)	250 (60.7)	347 (79.0)
The same	0 (0)	1 (0.1)	0 (0)	0 (0)	1 (0.2)	0 (0)
Total	709 (100)	661 (100)	766 (100)	530 (100)	412 (100)	439 (100)

** the cheapest samples of illegal 0.5L bottles of vodka were purchased for 110 ($1.76, €1.51, £1.32), 120 ($1.92, €1.65, £1.44), and 130 roubles ($2.08, €1,79, £1.56) per bottle in 2015, 2016, and 2017, respectively.*

Table 4. *Characteristics of not prohibited and prohibited for sale since 2017 non-beverage alcohols identified with minimum ethanol concentration of 60% by volume, 50 Russian cities, 2015-2017, (n (%))*

	Not prohibited for sale since 2017			Prohibited for sale since 2017		
	2015	**2016**	**2017**	**2015**	**2016**	**2017**
Place of purchase within city						
Center	225 (41.1)	234 (47.8)	322 (44.7)	71 (43.8)	63 (36.8)	24 (52.2)
Outlying area	322 (58.9)	256 (52.2)	398 (55.3)	91 (56.2)	108 (63.2)	22 (47.8)
Type of retail outlet						
Pharmacy	547 (100)	471 (96.1)	709 (98.4)	7 (4.3)	6 (3.5)	1 (2.2)
Kiosk	0 (0)	0 (0)	2 (0.3)	56 (34.6)	42 (24.6)	3 (6.5)
Open market	0 (0)	0 (0)	2 (0.3)	9 (5.6)	14 (8.2)	9 (19.6)
Covered market	0 (0)	1 (0.2)	0 (0)	26 (16.0)	13 (7.6)	10 (21.7)
Cosmetics/domestic chemistry shop	0 (0)	18 (3.7)	7 (1.0)	43 (26.5)	62 (36.3)	11 (23.9)
Supermarket	0 (0)	0 (0)	0 (0)	4 (2.5)	7 (4.1)	1 (2.2)
Home appliances shop	0 (0)	0 (0)	0 (0)	15 (9.3)	12 (7.0)	11 (23.9)
Grocery store	0 (0)	0 (0)	0 (0)	2 (1.2)	15 (8.8)	0 (0)
Type of non-beverage alcohol						
Medicinal tincture	501 (91.6)	453 (92.4)	676 (93.9)	0 (0)	0 (0)	0 (0)
Cosmetic lotion/tonic	0 (0)	0 (0)	0 (0)	80 (49.4)	84 (49.1)	2 (4.3)
Eau-de-cologne	0 (0)	19 (3.9)*	9 (1.3)*	74 (45.7)#	83 (48.5)#	43 (93.5)#
Antiseptic	46 (8.4)	17 (3.5)	35 (4.9)	0 (0)	1 (0.6)	1 (2.2)
Liquids for body or oral hygiene	0 (0)	0 (0)	0 (0)	5 (3.1)	2 (1.2)	0 (0)
Bath concentrates	0 (0)	0 (0)	0 (0)	2 (1.2)	0 (0)	0 (0)
Other	0 (0)	1 (0.2)	0 (0)	1 (0.6)	1 (0.6)	0 (0)
Bottle size (ml)						
25	387 (70.7)	380 (77.6)	583 (81.0)	0 (0)	0 (0)	0 (0)
40	62 (11.3)	55 (11.2)	69 (9.6)	0 (0)	0 (0)	0 (0)
50	17 (3.1)	8 (1.6)	37 (5.1)	0 (0)	0 (0)	0 (0)
80-98	0 (0)	19 (3.9)	6 (0.8)	49 (30.2)	60 (35.1)	23 (50.0)
99-100	81 (14.8)	28 (5.7)	25 (3.5)	109 (67.3)	105 (61.4)	23 (50.0)
>100	0 (0)	0 (0)	0 (0)	4 (2.5)	6 (3.5)	0 (0)
Bottle price (roubles)						
<10.00	62 (11.3)	36 (7.3)	5 (0.7)	0 (0)	0 (0)	0 (0)
10.00-19.99	247 (45.1)	209 (42.7)	215 (29.9)	54 (33.3)	15 (8.8)	0 (0)
20.00-29.99	159 (29.1)	124 (25.3)	230 (31.9)	91 (56.2)	64 (37.4)	3 (6.5)
30.00-39.99	71 (13.0)	62 (12.7)	147 (20.4)	14 (8.6)	38 (22.2)	22 (47.8)
≥40.00	8 (1.5)	59 (12.0)	123 (17.1)	3 (1.9)	54 (31.6)	21 (45.7)
Ethanol concentration (% by volume)						
60.0-69.9	0 (0)	17 (3.5)	3 (0.4)	78 (48.1)	76 (44.4)	40 (87.0)
70.0-79.9	418 (76.4)	348 (71.0)	510 (70.8)	68 (42.0)	83 (48.5)	5 (10.9)
80.0-89.9	23 (4.2)	41 (8.4)	63 (8.8)	2 (1.2)	5 (2.9)	0 (0)
90.0+	106 (19.4)	84 (17.1)	144 (20.0)	14 (8.6)	7 (4.1)	1 (2.2)
Unit cost per 10 ml pure ethanol (roubles)						
<3.00	30 (5.5)	11 (2.2)	4 (0.6)	58 (35.8)	26 (15.2)	0 (0)
3.00-5.99	153 (28.0)	89 (18.2)	57 (7.9)	96 (59.3)	86 (50.3)	17 (37.0)
6.00-8.99	192 (35.1)	165 (33.7)	165 (22.9)	8 (4.9)	52 (30.4)	21 (45.7)
≥9.00	172 (31.4)	225 (45.9)	494 (68.6)	0 (0)	7 (4.1)	8 (17.3)
Unit cost per 10 ml pure ethanol in comparison with that in standard 0.5L bottle of legal Russian vodka sold at minimum established by the state price						
Cheaper	393 (71.8)	285 (58.2)	277 (38.5)	162 (100)	167 (97.7)	42 (91.3)
More expensive	154 (28.2)	203 (41.4)	443 (61.5)	0 (0)	4 (2.3)	4 (8.7)
The same	0 (0)	2 (0.4)	0 (0)	0 (0)	0 (0)	0 (0)
Unit cost per 10 ml pure ethanol in comparison with that in illegal 0.5L bottle of vodka**						
Cheaper	146 (26.7)	100 (20.4)	81 (11.2)	154 (95.1)	112 (65.5)	20 (43.5)
More expensive	401 (73.3)	389 (79.4)	639 (88.8)	8 (4.9)	59 (34.5)	26 (56.5)
The same	0 (0)	1 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)
Total	547 (100)	490 (100)	720 (100)	162 (100)	171 (00)	46 (100)

** denatured eau-de-colognes; # not denatures eau-de-colognes*

*** the cheapest samples of illegal 0.5L bottles of vodka were purchased for 110 ($1.76, €1.51, £1.32), 120 ($1.92, €1.65, £1.44), and 130 roubles ($2.08, €1,79, £1.56) per bottle in 2015, 2016, and 2017, respectively.*

Table 5. *Characteristics of all purchased and reported as consumed for drinking non-beverage alcohols identified with minimum ethanol concentration of 60% by volume, with a unit cost for ethanol less than in legal vodka (<9.25 rubs (2015), <9.5 rubs (2016), <10,25 rubs (2017)/10ml), 50 Russian cities, 2015-2017, (n (%))*

	All non-beverage alcohols			Reported as drunk in Kazan narcology survey		
	2015	**2016**	**2017**	**2015**	**2016**	**2017**
Place of purchase within city						
Center	235 (42.3)	188 (41.6)	118 (37.0)	185 (41.0)	130 (40.8)	85 (35.7)
Outlying area	320 (57.7)	264 (58.4)	201 (63.0)	266 (59.0)	189 (59.2)	153 (64.3)
Type of retail outlet						
Pharmacy	400 (72.1)	277 (61.3)	272 (85.3)	342 (75.8)	207 (64.9)	209 (87.8)
Kiosk	56 (10.1)	40 (8.8)	4 (1.2)	45 (10.0)	31 (9.7)	1 (0.4)
Open market	9 (1.6)	12 (2,7)	8 (2.5)	8 (1.8)	11 (3.4)	5 (2.1)
Covered market	26 (4.7)	14 (3.1)	10 (3.1)	14 (3.1)	11 (3.4)	9 (3.8)
Cosmetics/domestic chemistry shop	43 (7.7)	75 (16.6)	14 (4.4)	24 (5.3)	37 (11.6)	10 (4.2)
Supermarket	4 (0.7)	7 (1.5)	1 (0.3)	4 (0.9)	6 (1.9)	1 (0.4)
Home appliances shop	15 (2.7)	12 (2.7)	10 (3.1)	12 (2.7)	3 (0.9)	3 (1.3)
Foods shop	2 (0.4)	15 (3.3)	0 (0)	2 (0.4)	13 (4.1)	0 (0)
Type of non-beverage alcohol						
Medicinal tincture	347 (62.5)	254 (56.2)	239 (74.9)	289 (64.1)	184 (57.7)	175 (73.5)
Cosmetic lotion/tonic	80 (14.4)	82 (18.1)	2 (0.6)	71 (15.7)	70 (21.9)	1 (0.4)
Eau-de-cologne	74 (13.3)	95 (21.0)	44 (13.8)	37 (8.2)	44 (13.8)	29 (12.2)
Antiseptic	46 (8.3)	18 (4.0)	34 (10.7)	46 (10.2)	18 (5.6)	33 (13.9)
Liquids for body or oral hygiene	5 (0.9)	2 (0.4)	0 (0)	5 (1.1)	2 (0.6)	0 (0)
Bath concentrates	2 (0.4)	0 (0)	0 (0)	2 (0.4)	0 ()	0 (0)
Other	1 (0.2)	1 (0.2)	0 (0)	1 (0.2)	1 (0.3)	0 (0)
Bottle size (ml)						
25	260 (46.8)	206 (45.6)	178 (55.8)	204 (45.2)	136 (42.6)	114 (47.9)
40	36 (6.5)	31 (6.9)	42 (13.2)	36 (8.0)	31 (9.7)	42 (17.6)
50	16 (2.9)	6 (1.3)	30 (9.4)	16 (3.5)	6 (1.9)	30 (12.6)
80-98	49 (8.8)	72 (15.9)	23 (7.2)	12 (2.7)	22 (6.9)	9 (3.8)
99-100	190 (34.2)	131 (29.0)	46 (14.4)	179 (39.7)	122 (38.2)	43 (18.1)
>100	4 (0.7)	6 (1.3)	0 (0)	4 (0.9)	2 (0.6)	0 (0)
Bottle price (roubles)						
<10.00	62 (11.2)	36 (8.0)	5 (1.6)	60 (13.3)	26 (8.2)	3 (1.3)
10.00-19.99	262 (47.2)	195 (43.1)	174 (54.5)	193 (42.8)	137 (42.9)	132 (55.5)
20.00-29.99	177 (31.9)	107 (23.7)	77 (24.1)	151 (33.5)	88 (27.6)	57 (23.8)
30.00-39.99	50 (9.0)	55 (12.2)	38 (11.9)	44 (9.8)	33 (10.3)	33 (13.9)
≥40.00	4 (0.7)	59 (13.1)	25 (7.8)	3 (0.7)	35 (11.0)	13 (5.5)
Ethanol concentration (% by volume)						
60.0-69.9	78 (14.1)	85 (18.8)	39 (12.2)	41 (9.1)	47 (14.7)	26 (10.9)
70.0-79.9	371 (66.8)	293 (64.8)	214 (67.1)	334 (74.1)	244 (76.5)	179 (75.2)
80.0-89.9	5 (0.9)	14 (3.1)	0 (0)	1 (0.2)	1 (0.3)	0 (0)
90.0+	101 (18.2)	60 (13.3)	66 (20.7)	75 (16.6)	27 (8.5)	33 (13.9)
Unit cost per 10 ml pure ethanol (roubles)						
<3.00	88 (15.9)	37 (8.2)	4 (1.3)	84 (18.6)	31 (9.7)	4 (1.7)
3.00-5.99	249 (44.9)	175 (38.7)	74 (23.2)	203 (45.0)	130 (40.8)	67 (28.2)
6.00-8.99	200 (36.0)	216 (47.8)	186 (58.3)	150 (33.3)	146 (45.8)	129 (54.1)
≥9.00	18 (3.2)	24 (5.3)	55 (17.2)	14 (3.1)	12 (3.8)	38 (16.0)
Unit cost per 10 ml pure ethanol in comparison with that in illegal 0.5L bottle of vodka**						
Cheaper	300 (54.1)	212 (46.9)	101 (31.7)	254 (56.3)	161 (50.5)	92 (38.7)
More expensive	255 (45.9)	239 (52.9)	218 (68.3)	197 (43.7)	157 (49.2)	146 (61.3)
The same	0 (0)	1 (0.2)	0 (0)	0 (0)	1 (0.3)	0 (0)
Total	555 (100)	452 (100)	319 (100)	451 (100)	319 (100)	238 (100)

** denatured eau-de-colognes; # not denatures eau-de-colognes*

*** the cheapest samples of illegal 0.5L bottles of vodka were purchased for 110 ($1.76, €1.51, £1.32), 120 ($1.92, €1.65, £1.44), and 130 roubles ($2.08, €1,79, £1.56) per bottle in 2015, 2016, and 2017, respectively.*

Table 6. *Characteristics of not prohibited and prohibited for sale since 2017 non-beverage alcohols identified with minimum ethanol concentration of 60% by volume, with a unit cost for ethanol less than in legal vodka (<9.25 rubs (2015), <9.5 rubs (2016), <10,25 rubs (2017)/10ml), 50 Russian cities, 2015-2017, (n (%))*

	Not prohibited for sale since 2017			Prohibited for sale since 2017		
	2015	**2016**	**2017**	**2015**	**2016**	**2017**
Place of purchase within city						
Center	164 (41.7)	127 (44.6)	96 (34.7)	71 (43.8)	61 (36.5)	22 (52.4)
Outlying area	229 (58.3)	158 (55.4)	181 (65.3)	91 (56.2)	106 (63.5)	20 (47.6)
Type of retail outlet						
Pharmacy	393 (100)	271 (95.1)	271 (97.8)	7 (4.3)	6 (3.6)	1 (2.4)
Kiosk	0 (0)	0 (0)	1 (0.4)	56 (34.6)	40 (24.0)	3 (7.2)
Open market	0 (0)	0 (0)	0 (0)	9 (5.6)	12 (7.2)	8 (19.0)
Covered market	0 (0)	1 (0.4)	0 (0)	26 (16.0)	13 (7.8)	10 (23.8)
Cosmetics/domestic chemistry shop	0 (0)	13 (4.5)	5 (1.8)	43 (26.5)	62 (37.1)	9 (21.4)
Supermarket	0 (0)	0 (0)	0 (0)	4 (2.5)	7 (4.2)	1 (2.4)
Home appliances shop	0 (0)	0 (0)	0 (0)	15 (9.3)	12 (7.2)	10 (23.8)
Foods shop	0 (0)	0 (0)	0 (0)	2 (1.2)	15 (9.0)	0 (0)
Type of non-beverage alcohol						
Medicinal tincture	347 (88.3)	254 (89.1)	239 (86.3)	0 (0)	0 (0)	0 (0)
Cosmetic lotion/tonic	0 (0)	0 (0)	0 (0)	80 (49.4)	82 (49.1)	2 (4.7)
Eau-de-cologne	0 (0)	14 (4.9)*	5 (1.8)*	74 (45.7)#	81 (48.5)#	39 (92.9)#
Antiseptic	46 (11.7)	17 (6.0)	33 (11.9)	0 (0)	1 (0.6)	1 (2.4)
Liquids for body or oral hygiene	0 (0)	0 (0)	0 (0)	5 (3.1)	2 (1.2)	0 (0)
Bath concentrates	0 (0)	0 (0)	0 (0)	2 (1.2)	0 (0)	0 (0)
Other	0 (0)	0 (0)	0 (0)	1 (0.6)	1 (0.6)	0 (0)
Bottle size (ml)						
25	260 (66.2)	206 (72.3)	178 (64.3)	0 (0)	0 (0)	0 (0)
40	36 (9.2)	31 (10.9)	42 (15.2)	0 (0)	0 (0)	0 (0)
50	16 (4.1)	6 (2.1)	30 (10.7)	0 (0)	0 (0)	0 (0)
80-98	0 (0)	14 (4.9)	3 (1.1)	49 (30.2)	58 (34.7)	20 (47.6)
99-100	81 (20.6)	28 (9.8)	24 (8.7)	109 (67.3)	103 (61.7)	22 (52.4)
>100	0 (0)	0 (0)	0 (0)	4 (2.5)	6 (3.6)	0 (0)
Bottle price (roubles)						
<10.00	62 (15.8)	36 (12.6)	5 (1.8)	0 (0)	0 (0)	0 (0)
10.00-19.99	208 (52.9)	180 (63.2)	174 (62.8)	54 (33.3)	15 (9.0)	0 (0)
20.00-29.99	86 (21.9)	43 (15.1)	74 (26.7)	91 (56.2)	64 (38.3)	3 (7.1)
30.00-39.99	36 (9.2)	17 (6.0)	16 (5.8)	14 (8.6)	38 (22.8)	22 (52.4)
≥40.00	1 (0.3)	9 (3.2)	8 (2.9)	3 (1.9)	50 (29.9)	17 (40.5)
Ethanol concentration (% by volume)						
60.0-69.9	0 (0)	13 (4.6)	3 (1.1)	78 (48.1)	72 (43.1)	36 (85.7)
70.0-79.9	303 (77.1)	210 (73.7)	209 (75.5)	68 (42.0)	83 (49.7)	5 (11.9)
80.0-89.9	3 (0.8)	9 (3.2)	0 (0)	2 (1.2)	5 (3.0)	0 (0)
90.0+	87 (22.1)	53 (18.6)	65 (23.5)	14 (8.6)	7 (4.2)	1 (2.4)
Unit cost per 10 ml pure ethanol (roubles)						
<3.00	30 (7.6)	11 (3.9)	4 (1.4)	58 (35.8)	26 (15.6)	0 (0)
3.00-5.99	153 (38.9)	89 (31.2)	57 (20.6)	96 (59.3)	86 (51.5)	17 (40.5)
6.00-8.99	192 (48.9)	164 (57.5)	165 (59.6)	8 (4.9)	52 (31.1)	21 (50.0)
≥9.00	18 (4.6)	21 (7.4)	51 (18.4)	0 (0)	3 (1.8)	4 (9.5)
Unit cost per 10 ml pure ethanol in comparison with that in illegal 0.5L bottle of vodka**						
Cheaper	146 (37.2)	100 (35.1)	81 (29.2)	154 (95.1)	112 (67.1)	20 (47.6)
More expensive	247 (62.8)	184 (64.5)	196 (70.8)	8 (4.9)	55 (32.9)	22 (52.4)
The same	0 (0)	1 (0.4)	0 (0)	0 (0)	0 (0)	0 (0)
Total	393 (100)	285 (100)	277 (100)	162 (100)	167 (100)	42 (100)

** denatured eau-de-colognes; # not denatures eau-de-colognes*

*** the cheapest samples of illegal 0.5L bottles of vodka were purchased for 110 ($1.76, €1.51, £1.32), 120 ($1.92, €1.65, £1.44), and 130 roubles ($2.08, €1,79, £1.56) per bottle in 2015, 2016, and 2017, respectively*

Table 7. *Number of samples of non-beverage alcohols with 60% or more ethanol purchased, by city, 2015-2017, (n)*

City	Total	Items prohibited for sale since 2017	Medicinal tinctures		
			25 ml	40 ml	100 ml*
		2015			
Berdsk	38	7	27	3	0
Chelyabinsk	26	12	12	2	0
Iskitim	23	12	8	2	0
Izhevsk	74	26	26	5	13
Kazan	48	10	35	2	0
Kopeysk	30	4	24	1	0
Korkino	16	1	13	1	0
Krasnodar	37	1	25	4	0
Krasnoyarsk	34	11	19	2	0
Novosibirsk	42	1	23	4	9
Novotroitsk	34	12	17	2	1
Orsk	51	10	25	3	9
Voronezh	49	29	9	8	1
Votkinsk	36	0	26	3	4
Rostov-on-Don	24	13	7	2	0
Ryazan	40	4	26	9	0
Sarapul	40	0	24	3	9
Stavropol	28	8	13	3	0
Tyumen	39	1	28	3	5
Total	709	162	387	62	51
		2016			
Arkhangelsk	51	14	30	3	1
Danilov	22	2	16	2	1
Kazan	33	10	20	2	0
Khabarovsk	26	10	12	4	0
Moscow	71	30	31	4	4
Murmansk	43	16	23	3	0
Orekhovo-Zuevo	29	3	22	3	0
Petropavlovsk-Kamchatsky	30	5	20	5	0
Petrozavodsk	44	8	30	4	0
Petushki	42	16	22	3	1
Vologda	50	12	27	4	3
Rossosh	41	15	22	3	1
Saratov	52	12	28	5	6
Sochi	53	17	29	5	0
Ulan-Ude	39	6	28	4	0
Yakutsk	35	14	20	1	0
Total	661	190	380	55	17
		2017			
Arkhangelsk	46	2	37	3	1
Chita	38	1	32	3	0
Barnaul	29	1	23	3	2
Chelyabinsk	18	1**	15	2	0
Inta	33	1	27	3	0
Irkutsk	33	1	25	5	0
Izhevsk	27	2	12	3	4
Kaliningrad	45	2	32	5	2
Kazan	30	4	21	4	1
Kemerovo	42	1	37	3	1
Labytnangi	28	1	22	3	0
Norilsk	37	1	32	4	0
Odintsovo	44	4	33	3	1
Petushki	37	10	24	2	0
Pitkaranta	32	0	30	2	0
Volgograd	60	6	44	5	0
Salekhard	27	1	21	3	0
Suojarvi	19	1	14	2	0
Tver	52	0	40	5	0
Tula	56	14	33	4	2
Zeya	33	1	29	2	0
Total	766	55	583	69	14

** including medicinal spirituous solutions for internal use, regulated as medicinal tinctures, sold in 100 ml bottles (e.g. Limanovit);*
*** antiseptic for veterinary use "StopSept" (100ml bottle, 75% ethanol, not denatured, cheap unit cost of ethanol) registered for production and sale in 2017.*

Table 8. *Number of retail outlets visited by characteristics of non-beverage alcohols sold, by city, 2015-2017, (n)*

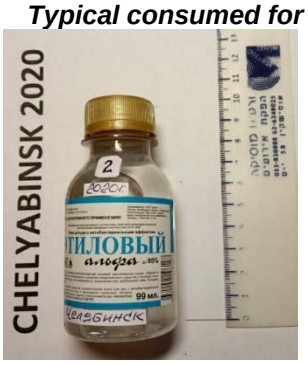
City	Visited	Selling products 60% or more ethanol	Selling products with unit cost < legal vodka	Selling products reported as drunk in Kazan	Selling products prohibited for sale since 2017	Selling medicinal tinctures		
						25 ml	40 ml	100 ml*
			2015					
Berdsk	10	8	8	7	3	5	3	0
Chelyabinsk	18	7	7	7	4	3	2	0
Iskitim	8	6	6	6	4	2	2	0
Izhevsk	12	8	8	8	3	5	5	4
Kazan	19	11	11	11	7	5	2	0
Kopeysk	11	7	7	7	2	5	1	0
Korkino	8	4	4	4	1	4	1	0
Krasnodar	24	7	7	7	1	5	4	0
Krasnoyarsk	16	9	8	9	4	5	2	0
Novosibirsk	22	8	6	8	1	7	4	3
Novotroitsk	18	10	10	10	6	4	2	1
Orsk	15	8	8	8	5	5	3	4
Voronezh	24	15	14	15	5	9	8	1
Votkinsk	16	5	5	5	0	5	3	3
Rostov-on-Don	17	5	5	5	2	3	2	0
Ryazan	14	12	12	12	2	9	9	0
Sarapul	14	6	6	6	0	6	3	4
Stavropol	16	9	9	9	4	6	3	0
Tyumen	21	9	6	9	1	7	3	2
Total	303	154	147	153	55	100	62	22
			2016					
Arkhangelsk	24	11	11	8	5	5	3	1
Danilov	8	6	5	6	2	3	2	1
Kazan	19	6	4	6	1	5	2	0
Khabarovsk	27	7	5	7	3	4	3	0
Moscow	33	12	12	12	6	5	4	4
Murmansk	13	7	7	7	4	3	3	0
Orekhovo-Zuevo	12	5	5	5	1	4	3	0
Petropavlovsk-Kamchatsky	32	13	5	9	1	11	5	0
Petrozavodsk	16	8	8	8	3	5	4	0
Petushki	15	11	11	11	6	5	3	1
Vologda	16	9	9	9	6	5	4	2
Rossosh	12	7	7	6	4	4	3	1
Saratov	18	13	13	12	7	6	5	4
Sochi	16	9	8	8	4	5	5	0
Ulan-Ude	14	8	8	8	3	5	3	0
Yakutsk	10	5	5	5	2	3	1	0
Total	285	137	123	127	58	78	53	14
			2017					
Arkhangelsk	24	6	4	6	1	5	3	1
Chita	16	6	6	6	1	5	3	0
Barnaul	14	6	5	6	1	5	3	2
Chelyabinsk	18	5	5	4	1**	4	2	0
Inta	8	5	5	5	1	4	3	0
Irkutsk	28	6	6	5	1	5	5	0
Izhevsk	12	6	5	6	1	4	3	1

Kaliningrad	10	7	7	7	2	5	5	1
Kazan	19	11	8	11	1	8	4	1
Kemerovo	14	6	4	6	1	5	3	1
Labytnangi	8	5	5	5	1	4	3	0
Norilsk	13	6	4	6	1	5	4	0
Odintsovo	10	8	7	8	2	6	3	1
Petushki	15	6	6	5	1	5	2	0
Pitkaranta	8	4	3	4	0	4	2	0
Volgograd	24	10	10	9	3	6	5	0
Salekhard	12	6	3	6	1	5	3	0
Suojarvi	6	5	5	4	1	4	2	0
Tver	10	7	6	7	0	7	5	0
Tula	11	6	6	6	4	4	4	2
Zeya	8	5	2	5	1	4	2	0
Total	296	132	112	127	26	104	69	10

** including medicinal spirituous solutions for internal use, regulated as medicinal tinctures, sold in 100 ml bottles (e.g. Limanovit);*
*** antiseptic for veterinary use "StopSept" (100ml bottle, 75% ethanol, not denatured, cheap unit cost of ethanol) registered for production and sale in 2017.*

Figure 1. *Map of the Russian Federation showing location of surveyed cities*

Typical consumed for drinking non-beverage alcohols available at least till September 2020



Anti-SARS-CoV-2 hand sanitizer "Ethyl Alpha", 99 ml plastic bottle, 95% ethanol,apperared in2020

Antiseptic for veterinary use "StopSept", 100 ml glass bottle, 90% ethanol, appeared in 2017

Medicinal ethanol 100 ml glass bottle 95% ethanol

"Formic Spirit" 100 ml plastic bottle 70% ethanol

Tincture "Herboton" 100 ml glass bottle 70% ethanol

Eau-de-cologne ""Troynoy", 99 ml glass bottle, 60% ethanol

Solution "Limanovit" 100 ml glass bottle 95% ethanol

Pepper tincture 100 ml glass bottle 70% ethanol

Hawthorn tincture 25 ml glass bottle 70% ethanol

Tincture of Valerian 25 ml glass bottle 70% ethanol

Tincture of Motherwort 25 ml glass bottle 70% ethanol

Tincture of Calendula 40 ml glass bottle 70% ethanol

Typical consumed for drinking non-beverage alcohols removed from the market from 2017

Cosmetic lotion "Vesnushka" 250 ml plastic bottle 75% ethanol

Concentrate for taking bath "Hawthorn" 250 ml plastic bottle 93% ethanol

Cosmetic lotion "Hawthorn" 250 ml plastic bottle 75% ethanol

Cosmetic lotion "LUX" 99 ml glass bottle 75% ethanol

Figure 2. *Typical non-beverage alcohols consumed for drinking, purchased in availability survey in 2015-2020.*

Figure 3. *The samples of spirituous food flavor enhansers (45 % ethanol by volume, 0.5 L bottle) purchased in availability survey in 2015-2016.*

Figure 4. *Anti-SARS-CoV-2 hand sanitizer ("hand tonic Ethyl Alpha", 99 ml bottle, 95 % ethanol by volume, not denatured, low unit cost of ethanol) used for drinking as was observed by a fieldworker, and a small street shop selling it round-the-clock (24 hours a day), Chelyabinsk, Russia, 2020.*

Vodka "Versta", Novotroitsk 2016 | *Vodka "Belaya Beryoza", Sochi 2016* | *Rum "Bacardi Black", Ryazan 2016*

Whiskey "Jameson", Ryazan 2016 | *Vodka "Bobrovka", Ryazan 2016* | *Vodka"Tsarskaya Okhota",Ryazan 2016*

Cognac "Hennessy", Ryazan 2017 | *Cognac"Abilay Khan",Chelyabinsk 2017* | *Whiskey"Jack Daniels",Chelyabinsk 2017*

Figure 5. *Typical samples of falsified and illicit alcoholic beverages sold at prices below minimum state prices established for alcoholic beverages, purchased in availability survey in 2015-2017.*

Vodka"Tsarskaya Okhota",Ryazan 2018

Cognac "Hennessy", Ryazan 2018

Cognac "Dagestan", Ryazan 2018

Vodka"Belaya Beryoska",Chelyabinsk 2019

Cognac "Rossiyskiy", Ryazan 2019

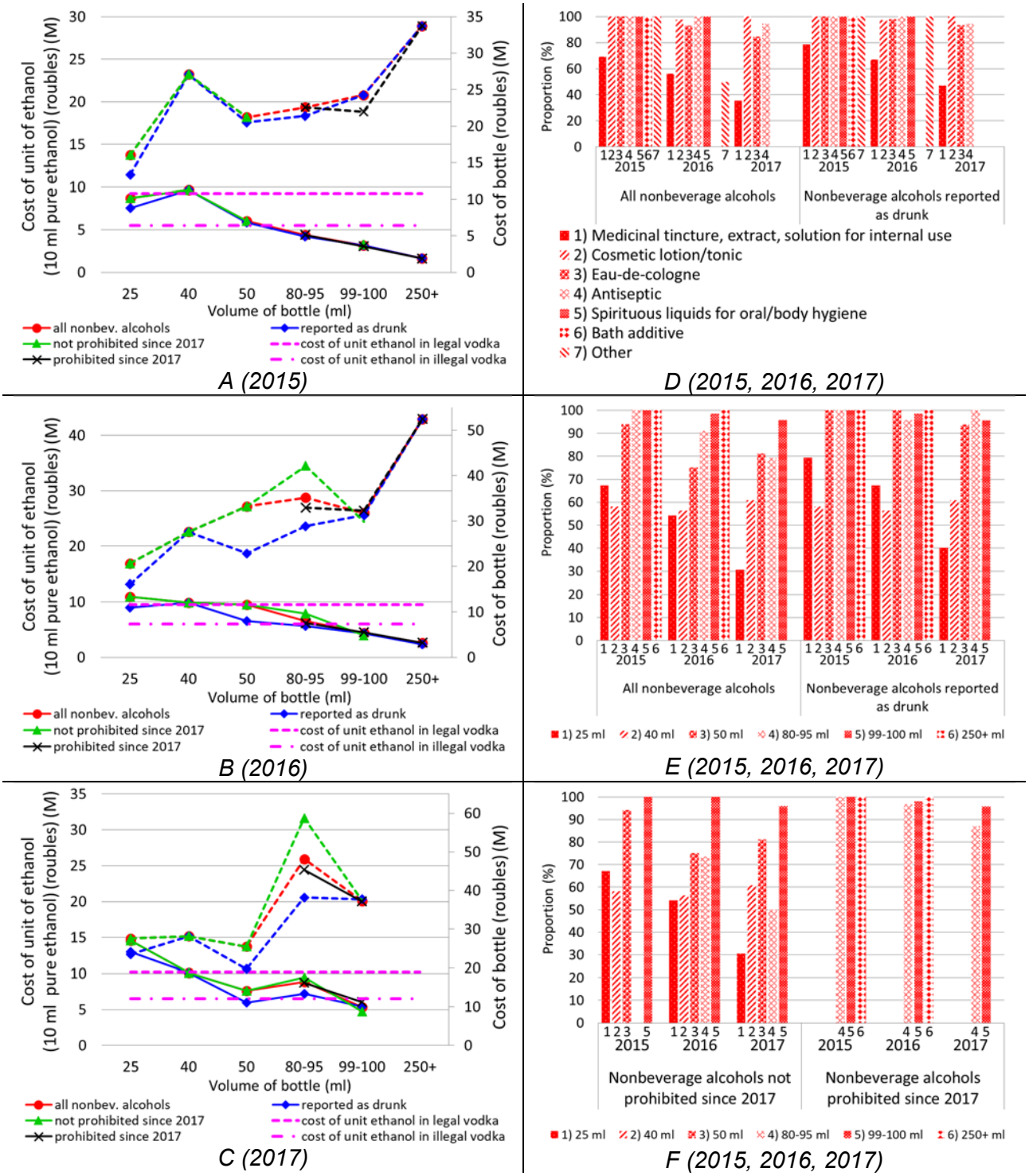
Cognac "Divin 3", Petushki 2019

Vodka "Staroe Cafe", Petushki 2020

Cognac "Kazakhstan",Chelyabinsk 2020

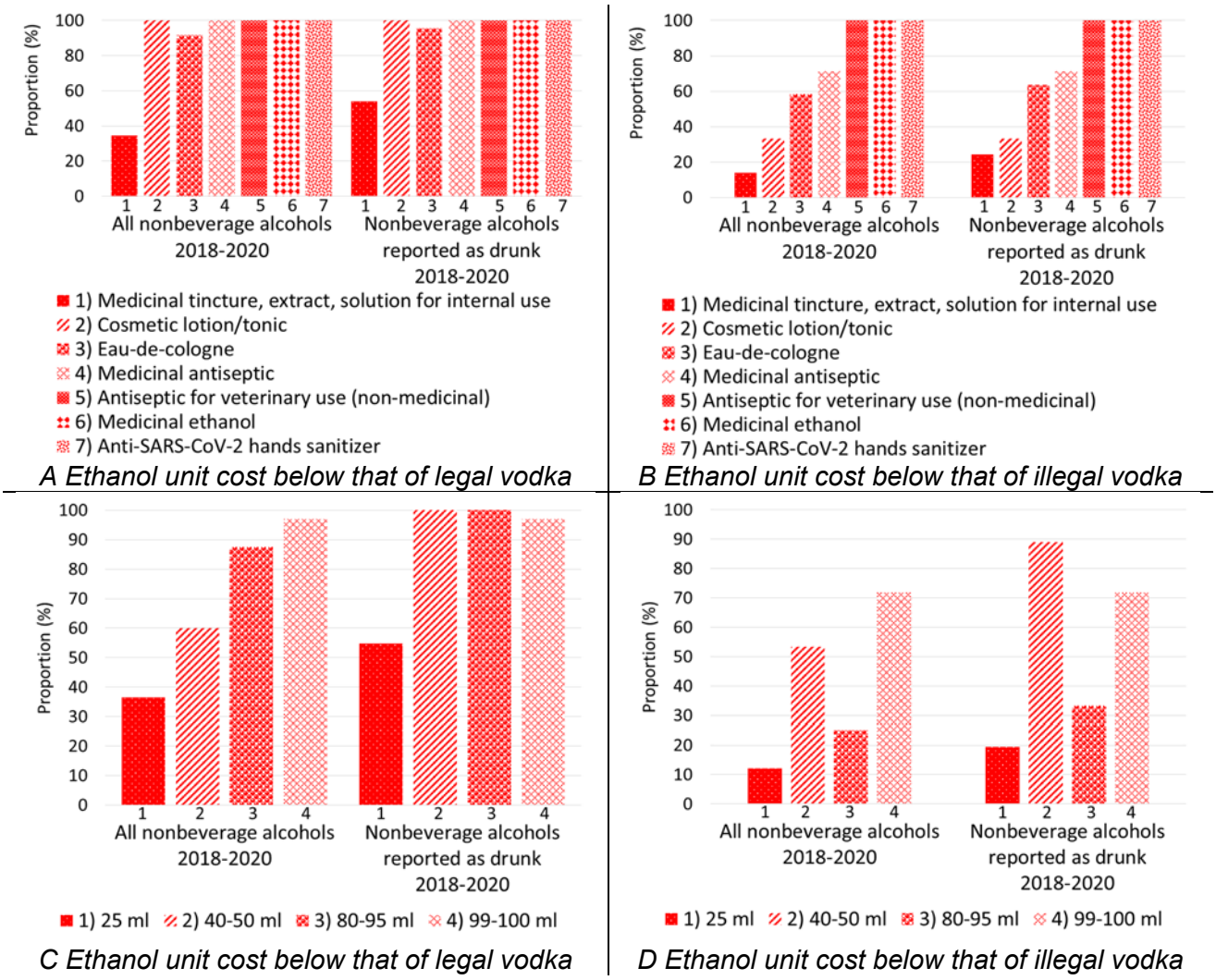
Whiskey"Johnny Walker", Ryazan 2020

Figure 6. *Typical samples of falsified and illicit alcoholic beverages sold at prices below minimum state prices established for alcoholic beverages, purchased in availability survey in 2018-2020.*



A, B, C: Relationship of the size of bottle to mean unit cost of ethanol (10 ml of pure ethanol) (continuous line) and bottle price (dash line) in non-beverage alcohols, and comparison with a unit cost of ethanol in legal Russian vodka sold at minimum established by the state price, and in illegal vodka
D, E, F: Proportion of non-beverage alcohols with a unit cost of ethanol (10 ml of pure ethanol) below that of standard Russian vodka, by type of non-beverage alcohol, the status of reported consumption for drinking by subjects with alcohol and substance use disorders (Gil et al., 2018a), the volume of the bottle, and status of prohibition since 2017.

Figure 7. *Results of econometric analysis of available non-beverage alcohols by their type, prohibition status, and reported consumption for drinking, 2015-2017.*



Proportion of non-beverage alcohols with a unit cost of ethanol (10 ml of pure ethanol) below that of standard Russian vodka (A, C), and illegal unrecorded vodka (B, D), by type of non-beverage alcohol (A, B), the volume of the bottle (C, D), and status of reported consumption for drinking by subjects with alcohol and substance use disorders (A, B, C, D) (Gil et al., 2018a)

Figure 8. *Results of econometric analysis of available non-beverage alcohols by their type and reported consumption for drinking, 2018-2020.*

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EDITORIAL

RESUMO DO CONTATO COM O DR. MARIK. MEDICINA PULMONAR E DE CUIDADOS CRÍTICOS. ESCOLA MÉDICA DA VIRGÍNIA ORIENTAL – EUA.

SUMMARY OF CONTACT WITH DR. MARIK. PULMONARY MEDICINE AND CRITICAL CARE. EASTERN VIRGINIA MEDICAL SCHOOL - USA.

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JLPPHS, Brazil.

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02 December 2020

EDITORIAL

Esta breve nota introduz a reprodução de conteúdo medico, de autoria do Doutor Paul E. Marik. O Dr. Marik é Professor de Medicina e Chefe de Medicina Pulmonar e de Cuidados Críticos da Eastern Virginia Medical School em Norfolk, Virginia (EUA). Dr. Marik é um profissional extremamente qualificado e experiente. A reimpressão do material foi autorizada pelo próprio Dr. Marik em 02/12/2020. Este material é relevante no cenário Brasileiro pela proposição de procedimentos padronizados aos pacientes contaminados pelo corona vírus. Foi selecionado apenas 1 dos 5 arquivos gentilmente cedidos pelo autor, em formato PDF, e reproduzido na forma como foi recebido, sem qualquer edição. Devido ao amplo período de duração da pandemia, os editores do Jornal (que não são médicos) já tiveram a oportunidade de acompanhar o desenvolvimento da doença em mais de uma pessoa infectada. O tipo de tratamento oferecido aos pacientes parece influenciar no curso, duração e severidade da doença. Os tratamentos descritos nos materiais a seguir, parecem ser eficazes e com bons resultados. Visando não influenciar ninguém, os editores irão se abster de realizar comentários adicionais sobre os métodos propostos, restringindo-se a sugerir que os mesmos sejam discutidos com o médico de confiança do leitor em caso de necessidade ou dúvidas. Informações completas, atualizadas e também traduzidas para o Português estão disponíveis em <https://covid19criticalcare.com/covid-19-protocols/translations/>. Somos gratos ao Dr. Marik pela gentileza de nos ceder seu tempo neste período conturbado.

Palavras-chave: *covid-19, saúde publica, tratamento medico.*

EDITORIAL

This brief note introduces the reproduction of medical content, authored by Doctor Paul E. Marik. Dr. Marik is Professor of Medicine and Chief of Pulmonary Medicine and Critical Care at Eastern Virginia Medical School in Norfolk, Virginia (USA). Dr. Marik is an extremely qualified and experienced professional. The reprinting of the material was authorized by Dr. Marik himself on 12/02/2020. This material is relevant in the Brazilian scenario due to standardized procedures for patients infected with the coronavirus. Only 1 of the 5 files kindly provided by the author, in PDF format, was selected and reproduced as received, without any editing. Due to the pandemic's long duration, the Journal editors (who are not medical doctors) have already had the opportunity to monitor the development of the disease in more than one infected person. The type of treatment offered to patients seems to influence the course, duration, and severity of the disease. The treatments described in the materials below appear to be effective and have good results. The editors will refrain from making additional comments on the proposed methods not to influence anyone, restricting themselves to suggesting that they be discussed with the reader's trusted doctor in case of need or doubts. Complete, updated information and also translated into Portuguese are available at <https://covid19criticalcare.com/covid-19-protocols/translations/>. We are grateful to Dr. Marik for his kindness in giving us his time in this troubled period.

Keywords: *covid-19, public health, medical treatment.*

Reprodução de conteudo

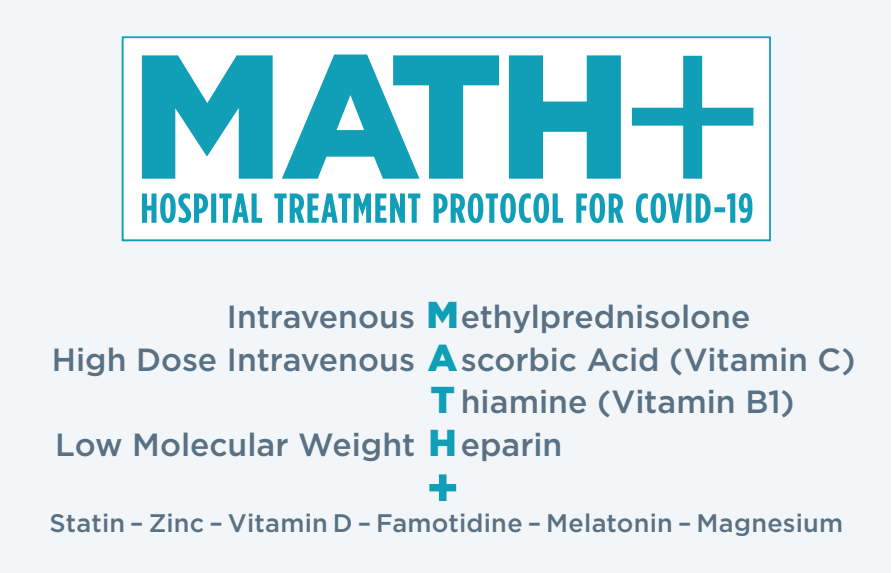
An overview of the MATH+ and I-MASK+ Protocols

An overview of the MATH+ and I-MASK+ Protocols

A Guide to the Management of COVID-19

Developed and Updated by Paul Marik, MD, FCP (SA), FRCP (C), FCCP, FCCM for the COVID-19 Critical Care Alliance (FLCCC Alliance).

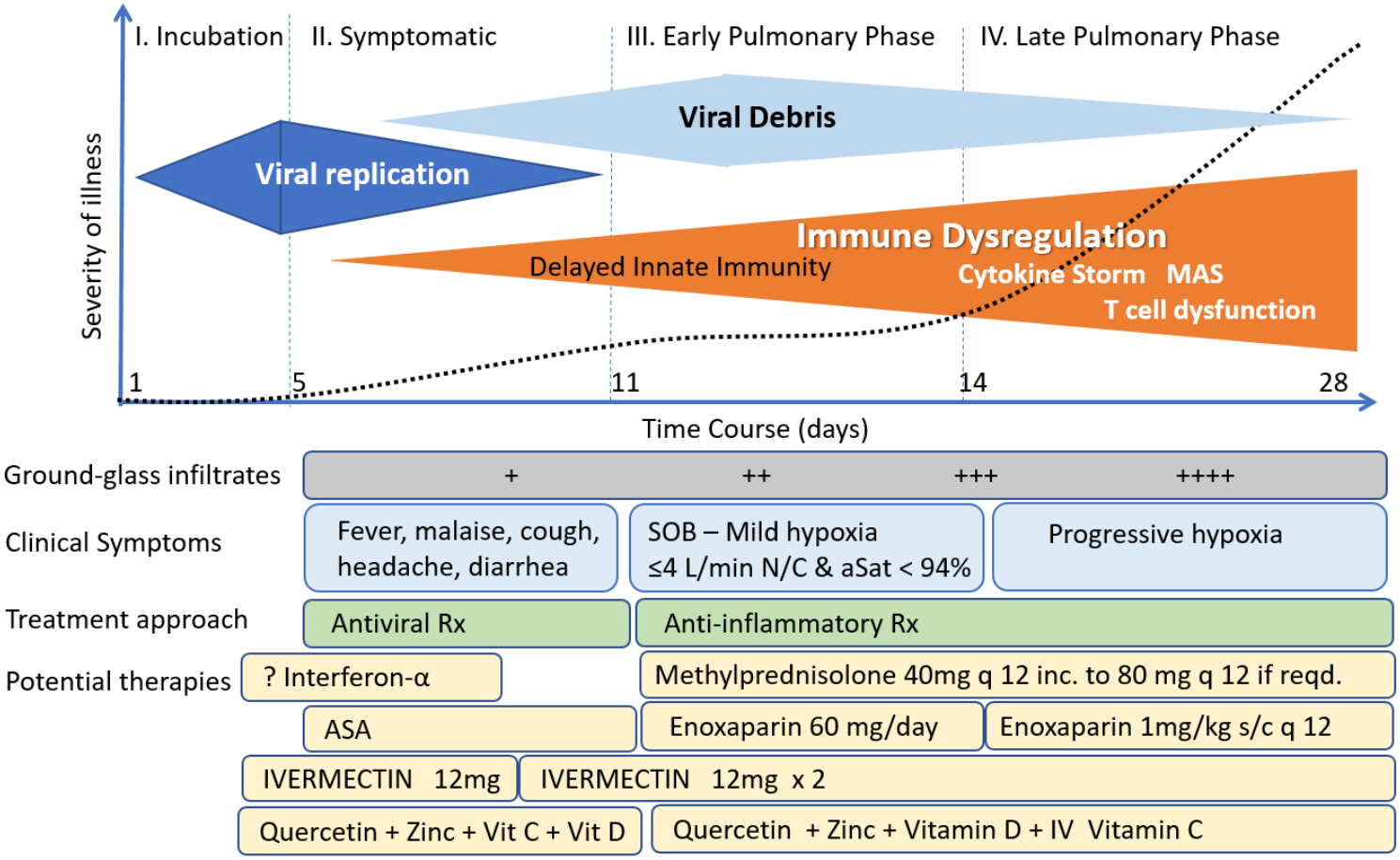
This is our recommended approach to COVID-19 based on the best (and most recent) literature. This is a highly dynamic topic; therefore, we will be updating the guideline as new information emerges. Please check on the FLCCC Alliance website for updated versions of this protocol. www.flccc.net



Disclaimer: The information in this document is provided as guidance to physicians World-Wide on the prevention and treatment of COVID-19. Our guidance should only be used by medical professionals in formulating their approach to COVID-19. Patients should always consult with their physician before starting any medical treatment.

The FLCCC Alliance™ is registered as a 501(c)(3) non-profit organization.

Figure 1. The course of COVID-19 and General Approach to treatment



THIS IS A STEROID RESPONSIVE DISEASE:

HOWEVER, TIMING IS CRITICAL

Table 1. Pharmacological therapy for COVID by stage of illness: What has worked and what has failed*

	Pre-exposure/ Post-Exposure/ Incubation	Symptomatic Phase	Pulmonary/ inflammatory phase
Hydroxychloroquine	Unclear benefit	No benefit	?Trend to harm
Remdesivir	n/a	?? Reduced time to recovery No mortality benefit	No benefit
Lopivinar-Ritonavir	n/a	No benefit	No benefit
Interferon α/β	Inhaled ? Benefit	No benefit	?Trend harm
Tocilizumab	n/a	n/a	No Benefit
Convalescent Serum	n/a	Unlikely	No Benefit
Corticosteroids	n/a	Trend to harm	BENEFIT
Ivermectin	BENEFIT	BENEFIT	BENEFIT

*based on randomized controlled trials (see supporting information below)

Figure 2. Timing of the initiation of anti-inflammatory therapy

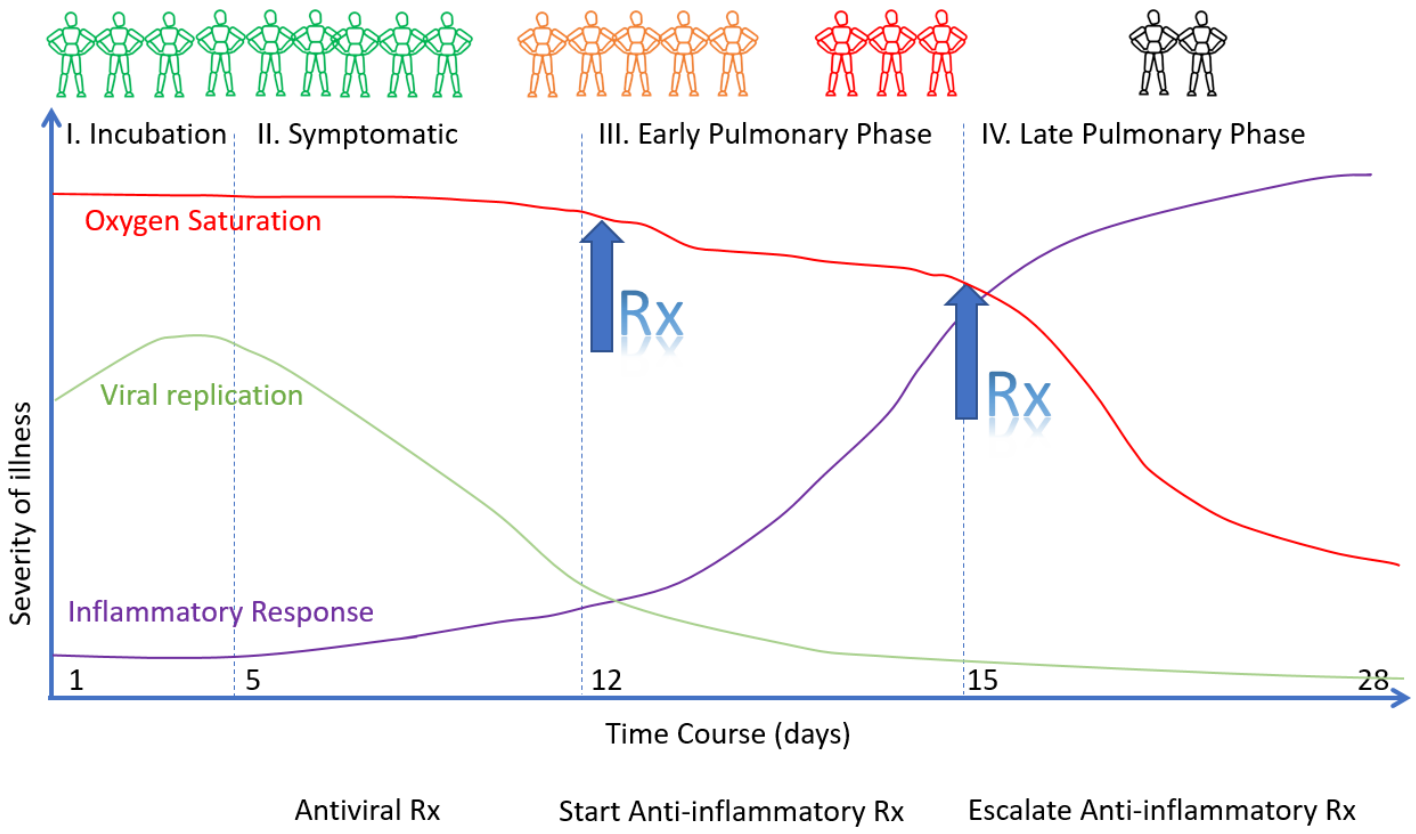


Figure 3. Time course of laboratory tests for COVID-19

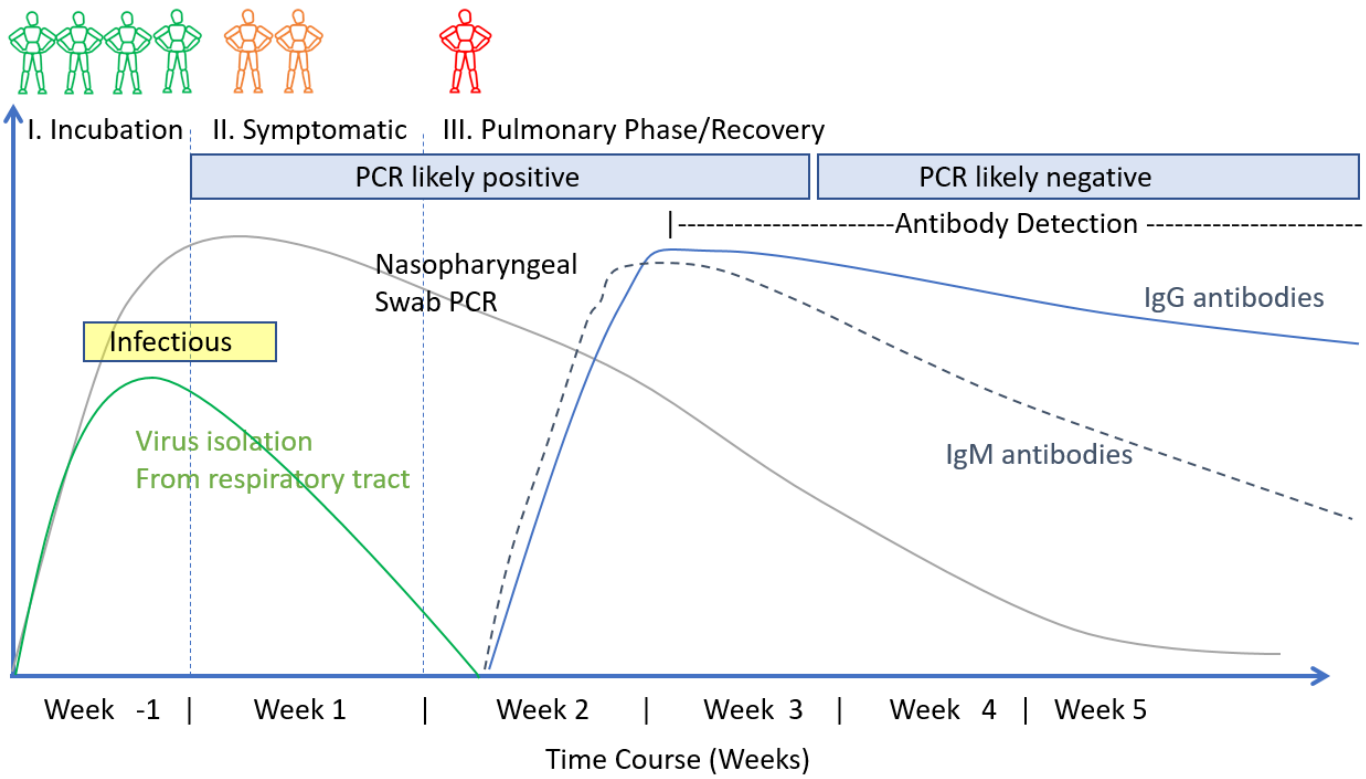
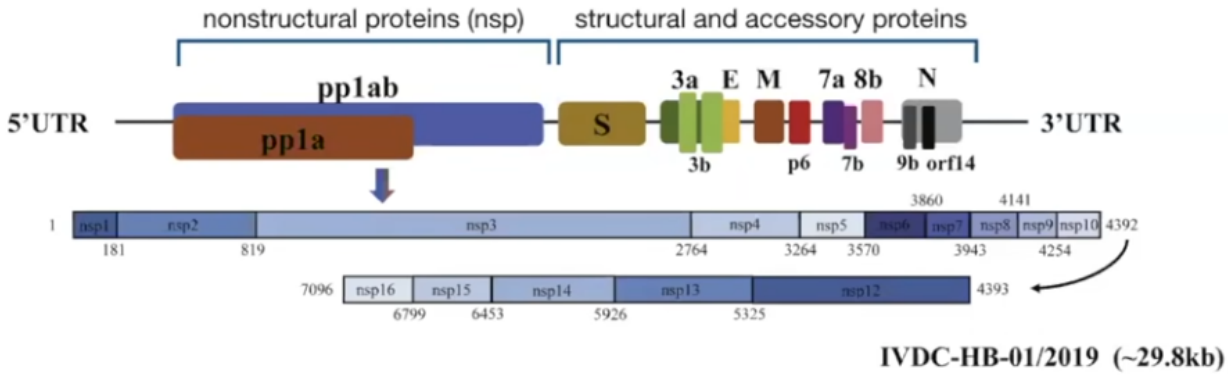


Figure 4. SARS-Co-V-2 RNA genome



It should be noted that there is no cure or "Magic-bullet" for the prevention or treatment of COVID-19. However, recently, a number of therapeutic agents have shown promise for both the prevention and treatment of COVID-19 including ivermectin, Vitamin D, quercetin, melatonin and corticosteroids. Furthermore, it is likely that no single drug will be effective in treating this complex disease and that multiple drugs with different mechanisms of action and used in specific phases of the disease will be required.

Prophylaxis

While there is no "Level 1 evidence" that this "cocktail" will prevent/mitigate against COVID-19 we believe there is significant evidence supporting the efficacy of the individual agents included in the prophylactic protocol. This protocol MUST be part of an overall strategy which includes common sense public health measures, i.e. masks, social distancing, and avoidance of large groups of people. Furthermore, it should be noted that there is emerging evidence suggesting that IVERMECTIN may be highly effective in the prevention and treatment of COVID-19. It is important to emphasize that ALL of the medications included in our prophylactic regimen are inexpensive, safe, and widely available.

- Vitamin D3 1000–3000 IU/day. Note RDA (Recommended Daily Allowance) is 800–1000 IU/day. The safe upper-dose daily limit is likely < 4000 IU/day. [1–22] Vitamin D insufficiency has been associated with an increased risk of acquiring COVID-19 and from dying from the disease. Vitamin D supplementation may therefore prove to be an effective and cheap intervention to lessen the impact of this disease, particularly in vulnerable populations, i.e. the elderly, those of color, obese and those living > 45° latitude. [7–22]
- Vitamin C 500 mg BID (twice daily) and Quercetin 250 mg daily. [23–34] It is likely that vitamin C and quercetin have synergistic prophylactic benefit. [35] It should be noted that *in vitro* studies have demonstrated that quercetin and other flavonoids interfere with thyroid hormone synthesis at multiple steps in the synthetic pathway. [36–39] The use of quercetin has rarely been associated with hypothyroidism. The clinical impact of this association may be limited to those individuals with pre-existent thyroid disease or those with sub-clinical thyroidism.[40] In women high consumption of soya was associated with elevated TSH concentrations.[41] The effect on thyroid function may be dose dependent, hence for chronic prophylactic use we suggest that the lowest dose be taken. Quercetin should be used with caution in patients with hypothyroidism and TSH levels should be monitored. It should also be noted quercetin may have important drug-drug interactions; the most important drug-drug interaction is with cyclosporin and tacrolimus. [42] In patients taking these drugs it is best to avoid quercetin; if quercetin is taken cyclosporin and tacrolimus levels must be closely monitored.
- Melatonin (slow release): Begin with 0.3 mg and increase as tolerated to 2 mg at night. [43–50]
- Zinc 30–50 mg/day (elemental zinc). [23,30,32,33,51–55]
- B complex vitamins [56–60]
- Ivermectin for postexposure prophylaxis (see ClinTrials.gov NCT04422561). 0.2 mg/kg (12 mg) immediately then repeat day 3.
- Ivermectin for pre-exposure prophylaxis (in HCW) and for prophylaxis in high risk individuals (> 60 years with co-morbidities, morbid obesity, long term care facilities, etc). 0.15–0.2 mg/kg (or 12 mg) Day 1, Day 3 and then every 4 weeks. [5,61,62] (also see ClinTrials.gov NCT04425850). NB. Ivermectin has a number of potentially serious drug-drug interactions. Please check for potential drug interaction at Ivermectin Drug Interactions - Drugs.com. The most important drug interactions occur with cyclosporin, tacrolimus, anti-retroviral drugs and certain anti-fungal drugs.

- *Optional:* Famotidine 20–40 mg/day [55–61]. Low level evidence suggests that famotidine may reduce disease severity and mortality. However, the findings of some studies are contradictory. While it was postulated that famotidine inhibits the SARS-CoV-2 papain-like protease (PLpro) as well as the main protease (3CLpro) this mechanism has been disputed.[58] Furthermore, a single study suggested that users of PPI's had a significantly increased odds for reporting a positive COVID-19 test when compared with those not taking PPIs, while individuals taking histamine-2 receptor antagonists were not at elevated risk.[62] This data suggest that famotidine may be the drug of choice when acid suppressive therapy is required.
- *Optional/Experimental:* Interferon-α nasal spray for health care workers [54]

Symptomatic patients at home **(for the duration of acute symptoms)**

- Vitamin C 500 mg BID and Quercetin 250–500 mg BID
- Zinc 75–100 mg/day (elemental zinc)
- Melatonin 10 mg at night (the optimal dose is unknown) [50]
- Vitamin D3 2000–4000 IU/day. Calcifediol 0.2 mg is an alternative. [63]
- Highly recommended: Ivermectin 0.15–0.2 mg/kg orally (repeat on day 3). [1–5,62,64–74] See Table 1, Figure 5 and ClinTrials.gov NCT04523831. See drug-drug interactions above.
- ASA 81–325 mg/day (unless contraindicated). ASA has antiinflammatory, antithrombotic, and antiviral effects.[75,76] Platelet activation may play a major role in propagating the prothrombotic state associated with COVID-19. [77]
- B complex vitamins
- *Optional:* Famotidine 40 mg BID (reduce dose in patients with renal dysfunction) [78–84].
- *Optional:* Vascepa (Ethyl eicosapentaenoic acid) 4g daily or Lovaza (EPA/DHA) 4g daily; alternative DHA/EPA 4g daily. Vascepa and Lovaza tablets must be swallowed and cannot be crushed, dissolved or chewed. Omega-3 fatty acids have anti-inflammatory properties and play an important role in the resolution of inflammation. In addition, omega-3 fatty acids may have antiviral properties. [32,85–88]
- *Optional:* Interferon-α/β s/c, nasal spray or inhalation. [89–92] It should be noted that Zinc potentiates the effects of interferon.[93,94]
- In symptomatic patients, monitoring with home pulse oximetry is recommended (due to asymptomatic hypoxia). The limitations of home pulse oximeters should be recognized, and validated devices are preferred.[95] Multiple readings should be taken over the course of the day, and a downward trend should be regarded as ominous.[95] Baseline or ambulatory desaturation < 94% should prompt hospital admission. [96] The following guidance is suggested: [95]
    - Use the index or middle finger; avoid the toes or ear lobe
    - Only accept values associated with a strong pulse signal
    - Observe readings for 30–60 seconds to identify the most common value
    - Remove nail polish from the finger on which measurements are made
    - Warm cold extremities prior to measurement
- *Not recommended:* Hydroxychloroquine (HCQ). The use of HCQ is extremely controversial.[97] The best scientific evidence to date suggests that HCQ has no proven benefit for post exposure prophylaxis, for the early symptomatic phase and in hospitalized patients. [98–115] Considering the unique pharmacokinetics of HCQ, it is unlikely that HCQ would be of benefit in patients with COVID-19 infection (it takes 5–10 days to achieve adequate plasma and lung concentrations).[107,116–118] Finally, it should be recognized that those studies which are widely promoted to support the use of HCQ are severely methodologically flawed.[119–122]

- *Not recommended:* Systemic or inhaled corticosteroids *(*budesonide). In the early symptomatic (viral replicative phase), corticosteroids may increase viral replication and disease severity.[123] An OpenSAFELY analysis in patients with COVID-19 demonstrated a higher risk of death in COPD and asthmatic patients using high dose ICS. [124] The role of ICS in the pulmonary phase is unclear as patients require systemic corticosteroids to dampen the cytokine storm, with ICS having little systemic effects.

I-MASK+

PROPHYLAXIS & EARLY OUTPATIENT TREATMENT PROTOCOL FOR COVID-19

PROPHYLAXIS PROTOCOL

Ivermectin	***Prophylaxis for high risk individuals*** 0.2 mg/kg* – one dose on day 1 and day 3, then take one dose every 4 weeks ***Post COVID-19 exposure prophylaxis***** 0.2 mg/kg* – one dose on day 1 and day 3
Vitamin D3	1,000–3,000 IU/day
Vitamin C	1,000 mg twice a day
Quercetin	250 mg/day
Zinc	50 mg/day
Melatonin	6 mg before bedtime (causes drowsiness)

EARLY OUTPATIENT PROTOCOL***

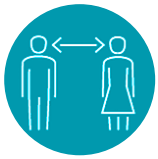
Ivermectin	0.2 mg/kg* – one dose on day 1 and day 3
Vitamin D3	4,000 IU/day
Vitamin C	2,000 mg 2–3 times daily
Quercetin	250 mg twice a day
Zinc	100 mg/day
Melatonin	10 mg before bedtime
Aspirin	325 mg/day (unless contraindicated)

Behavioral Prophylaxis

WEAR MASKS

Must wear cloth, surgical, or N95 mask (without valve) in all indoor spaces with non-household persons.

Must wear a N95 mask (without valve) during prolonged exposure to non-household persons in any confined, poorly ventilated area.



KEEP DISTANCE

Until the end of the Covid-19 crisis, we recommend keeping a minimum distance of approx. 2 m / 6 feet in public from people who are not from your own household.

Mildly Symptomatic patients (on floor/ward in hospital):

- Vitamin C 500–1000 mg q 6 hourly and Quercetin 250–500 mg BID (if available)
- Zinc 75–100 mg/day
- Melatonin 10 mg at night (the optimal dose is unknown) [50]
- Vitamin D3 20,000–60,000 IU single oral dose. Calcifediol 0.2–0.5 mg is an alternative. [63] This should be followed by 20,000 IU D3 (or 0.2 mg calcifediol) weekly until discharged from hospital. Calcifediol is more efficiently absorbed, achieves 25-OH vitamin D levels quicker and is three times more potent than vitamin D3. [125,126] However, it is important to note that the optimal dose of vitamin D in the acute setting is unknown.[127,128] Very high doses may paradoxically block the vitamin D receptor.
- Highly recommended: Ivermectin 0.15–0.2 mg/kg orally (12 mg) and repeat on day 3 [1–5,62,64–74]. It should be noted that ivermectin has potent anti-inflammatory properties apart from its antiviral properties.[129–131] See Table 1 and Figure 5. See drug-drug interaction above.
- B complex vitamins
- Enoxaparin 60 mg/day [72,132–145] Consider increasing the dose to 1mg/kg q 12 hourly in those with a high D-Dimer or an increasing D-Dimer (see Xa monitoring below).
- Methylprednisolone 40 mg q 12 hourly; increase to 80 mg and then 125mg q 12 hourly in patients with progressive symptoms and increasing CRP. There is now overwhelming and irrefutable evidence that corticosteroids reduce the risk of death in patients with the pulmonary phase of COVID-19 i.e. those requiring supplemental oxygen or higher levels of support. [146–158] The role of inhaled corticosteroids (budesonide) is unclear and appears to be rather limited.
- *Optional:* Famotidine 40 mg BID (20–40 mg/day in renal impairment). [78–84]
- *Optional:* Vascepa (Ethyl eicosapentaenoic acid) 4g daily or Lovaza (EPA/DHA) 4g daily; alternative DHA/EPA 4g daily.
- *Optional (not recommended):* Remdesivir 200 mg IV loading dose D1, followed by 100mg day IV for 9 days. [159,160] This agent has been reported to reduce time to recovery (based on an ordinal scale) in patients requiring low levels of supplemental oxygen. [160,161] The recently published SOLIDARITY trial demonstrated no mortality benefit of this agent in the entire treatment cohort or any subgroup.[162] Considering the high cost of this agent and the lack of benefit on patient centered outcomes the role of this drug seems very limited.
- N/C 2L/min if required (max 4 L/min; consider early t/f to ICU for escalation of care).
- Avoid Nebulization and Respiratory treatments. Use “Spinhaler” or MDI and spacer if required.
- T/f EARLY to the ICU for increasing respiratory signs/symptoms, increasing oxygen requirements and arterial desaturation.

Progressive Respiratory symptoms (hypoxia- requiring N/C ≥ 4 L min: admit to ICU):

Essential Treatment (dampening the STORM); MATH + [163]

1. ***Methylprednisolone*** 80 mg loading dose then 40 mg q 12 hourly for at least 7 days and until transferred out of ICU. In patients with an increasing CRP or worsening clinical status increase the dose to 80 mg q 12 hourly (then 125mg q 12 hourly), then titrate down as appropriate. [146–158] Pulse methylprednisolone 250–500 mg mg/day may be required.[156] As depicted in Table 1, methylprednisolone is the corticosteroid of choice.
2. ***Ascorbic acid (Vitamin C***) 3g IV q 6 hourly for at least 7 days and/or until transferred out of ICU.[27,164–174]. Note caution with POC glucose testing (see below). Oral absorption is limited by saturable transport and it is difficult to achieve adequate levels with PO administration. However, if IV Vitamin C is not available, attempts should be made to administer PO vitamin C at a dose of 1g every 4–6 hours.
3. ***Full anticoagulation***: Unless contraindicated we suggest FULL anticoagulation (on admission to the ICU) with enoxaparin, i.e. 1 mg kg s/c q 12 hourly (dose adjust with Cr Cl < 30mls/min). There is now good evidence that high intensity anticoagulation reduces mortality of hospitalized patients with COVID-19. [132,134,135,137–145,175] Heparin is suggested with CrCl < 15 ml/min. Due to augmented renal clearance patients may have reduced anti-Xa activity despite standard dosages of LMWH.[176] We therefore recommend monitoring anti-Xa activity in underweight and obese patients, those with chronic renal failure and in those patients with an increasing D-dimer, aiming for an anti-Xa activity of 0.6–1.1 IU.ml.

Note: A falling SaO2 and the requirement for supplemental oxygen should be a trigger to start anti-inflammatory treatment (see Figure 2).

Note: Early termination of ascorbic acid and corticosteroids will likely result in a rebound effect with clinical deterioration (see Figure 6).

Additional Treatment Components (the Full Monty)

4. Highly recommended: Ivermectin 0.15–0.2 mg/kg orally (repeat on day 2). Alternative strategy is a dose of 12 mg within 24 hours of symptom onset and then repeated 24 hours later. [1–5,62,64–74]. [1–3,64,67–74,129–131,177–184] Note that ivermectin has potent antiviral and ant-inflammatory effects.[129–131] See Table 1 and Figure 5.
5. Melatonin 10 mg at night (the optimal dose is unknown).
6. Vitamin D3 20,000–60,000 IU single oral dose. Calcifediol 0.2–0.5 mg is an alternative. This should be followed by 20,000 IU D3 (or 0.2 mg calcifediol) weekly until discharged from hospital.
7. Thiamine 200 mg IV q 12 hourly [185–190] Thiamine may play a role in dampening the cytokine storm. [186]
8. B complex vitamins
9. Magnesium: 2 g stat IV. Keep Mg between 2.0 and 2.4 mmol/l. [59] Prevent hypomagnesemia (which increases the cytokine storm and prolongs Qtc). [191–193]
10. *Optional:* Doxycycline 100mg daily for 5 days doxycycline is a broad spectrum antibiotics which appears to have synergistic anti-viral and anti-inflammatory effects when combined with Ivermectin.
11. *Optional (Consider in severe cases).* Anti-serotonin agents. It appears that excess release of serotonin from platelets may contribute to the "cytokine storm". Therefore, the "serotonin receptor blocker" cyproheptadine 4–8 mg PO q 6 hours should be considered. This may explain the beneficial effects of serotonin re-uptake inhibitors in patients with COVID-19. [194,195]

12. *Optional (Consider in severe cases).* ASA 325 mg daily. As note above platelet activation and the release of serotonin may play a role in the pathophysiology of severe COVID-19. As the risk of significant bleeding in increased in patients receiving both ASA and heparin, ASA should not be used in patients at high risk of bleeding. In addition (as noted below) patients should receive famotine concurrently.
13. *Optional.* Atorvastatin 80 mg/day. Statins have pleotropic anti-inflammatory, immunomodulatory, antibacterial, and antiviral effects. In addition, statins decrease expression of PAI-1. Simvastatin has been demonstrated to reduce mortality in the hyper-inflammatory ARDS phenotype. [196] Preliminary data suggests atorvastatin may improve outcome in patients with COVID-19.[197–201] Due to numerous drug-drug interactions simvastatin should be avoided.
14. *Optional:* Famotidine 40 mg BID (20–40 mg/day in renal impairment). [78–84].
15. *Optional:* Vascepa, Lovaza or DHA/EPA 4g day (see above).
16. *Not recommended:* The role of azithromycin in the treatment of COVID-19 is controversial. The best information to date suggests that azithromycin is of little benefit.[202,203]
17. *Not recommended:* Remdesivir. Has not benefit at this stage of the disease.
18. *Not recommended.* Convalescent serum [204,205] or monoclonal antibodies. (Eli Lilly recently announced that they are suspending their ACTIV-33 clinical trial as their monoclonal antibody failed to demonstrate a clinical benefit in hospitalized patients).
19. *Not recommended.* Tocilizumab. Four RCTS have now failed to demonstrate a clinical benefit from tocilizumab. [206–209]
20. Broad-spectrum antibiotics if superadded bacterial pneumonia is suspected based on procalcitonin levels and resp. culture (no bronchoscopy). Due to the paradox of hyper-inflammation and immune suppression (a major decrease of HLA-DR on CD14 monocytes and T cell dysfunction) secondary bacterial and fungal infection is not uncommon. [210]
21. Maintain *EUVOLEMIA* (this is not non-cardiogenic pulmonary edema). Due to the prolonged "symptomatic phase" with flu-like symptoms (6–8 days) patients may be volume depleted. Cautious rehydration with 500 ml boluses of Lactate Ringers may be warranted, ideally guided by non-invasive hemodynamic monitoring. Diuretics should be avoided unless the patient has obvious intravascular volume overload. Avoid hypovolemia.
22. Early norepinephrine for hypotension. It should however be appreciated that despite the cytokine storm, vasodilatory shock is distinctly uncommon in uncomplicated COVID-19 (when not complicated by bacterial sepsis). This appears to be due to the fact that TNF-α which is "necessary" for vasodilatory shock is only minimally elevated.
23. Escalation of respiratory support (steps); ***Try to avoid intubation if at all possible,*** (see Figure7)
    - Accept "permissive hypoxemia" (keep O2 Saturation > 84%); follow venous lactate and Central Venous O_2 saturations ($ScvO_2$) in patents with low arterial O_2 saturations
    - N/C 1–6 L/min
    - High Flow Nasal canula (HFNC) up to 60–80 L/min
    - Trial of inhaled Flolan (epoprostenol)
    - Attempt proning (cooperative repositioning-proning) [211,212]
    - Intubation … by Expert intubator; Rapid sequence. No Bagging; Full PPE. Crash/emergency intubations should be avoided.
    - Volume protective ventilation; Lowest driving pressure and lowest PEEP as possible. Keep driving pressures < 15 cm H_2O.
    - Moderate sedation to prevent self-extubation
    - Trial of inhaled Flolan (epoprostenol)
    - Prone positioning.

There is widespread concern that using HFNC could increase the risk of viral transmission. There is however, no evidence to support this fear. HFNC is a better option for the patient and the health care system than intubation and mechanical ventilation. CPAP/BiPAP may be used in select patients, notably those with COPD exacerbation or heart failure.

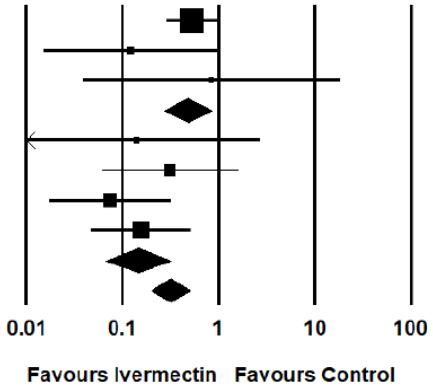
A sub-group of patients with COVID-19 deteriorates very rapidly. Intubation and mechanical ventilation may be required in these patients.

Table 2: Comparison of Methylprednisolone, Dexamethasone and Hydrocortisone- Number Need to Treat (NNT)

PUBLISHED RCT's/COHORT STUDIES OF CORTICOSTEROID THERAPY IN COVID-19		ABSOLUTE DIFFERENCE IN MORTALITY RATE (Rx Group vs. Control Group)	ESTIMATED NUMBER NEEDED TO TREAT TO SAVE ONE LIFE
METHYLPREDNISONE – HOSPITAL PATIENTS (Edalatifard et al, Iran)		5.9% vs. 42.9%	2.7
METHYLPREDNISONE – ICU PATIENTS (Salton et al, Italy)		7.2% vs. 23.3%	6.2
METHLPREDNISONE – HOSPITAL PATIENTS, (Fadel et al, USA)		13.6% vs. 26.3%	7.8
METHYLPREDNISONE- ARDS PATIENTS (Wu C et al- China)		46.0% vs. 61.8%	6.3
METHYLPREDNISONE - Pts on oxygen – (Fernandez-Cruz, Spain)		13.9% vs. 23.9%	10.0
CoDEX –DEXAMETHASONE - MECHANICAL VENTILATION		56.3% vs 61.5%	19.2
RECOVERY TRIAL (DEXAMATHASONE)	PTS ON OXYGEN	23.3% vs. 26.2%	28.6
	PTS ON MV	29.3% vs. 41.4%	8.4
HYDROCORTISONE -CAPE-COVID – ICU Patients (Dequin et al France)		14.7% vs 27.4%	7.9
HYDROCORTISONE –REMAP-CAP – ICU patients		28%% vs 33%	20.0

Figure 5. Metaanalysis of Ivermectin clinical studies (in hospital mortality)

Group by RCT-Obs	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
OBS	Rajter	0.524	0.287	0.958	-2.099	0.036
OBS	Khan	0.121	0.015	0.969	-1.990	0.047
OBS	Gorial	0.842	0.039	18.393	-0.109	0.913
OBS		0.477	0.270	0.844	-2.546	0.011
RCT	Mahmud	0.138	0.007	2.694	-1.306	0.192
RCT	Hashim	0.314	0.061	1.611	-1.389	0.165
RCT	Elgazzar	0.074	0.017	0.318	-3.502	0.000
RCT	Niaee	0.154	0.047	0.506	-3.080	0.002
RCT		0.146	0.067	0.316	-4.868	0.000
Overall		0.315	0.199	0.498	-4.933	0.000

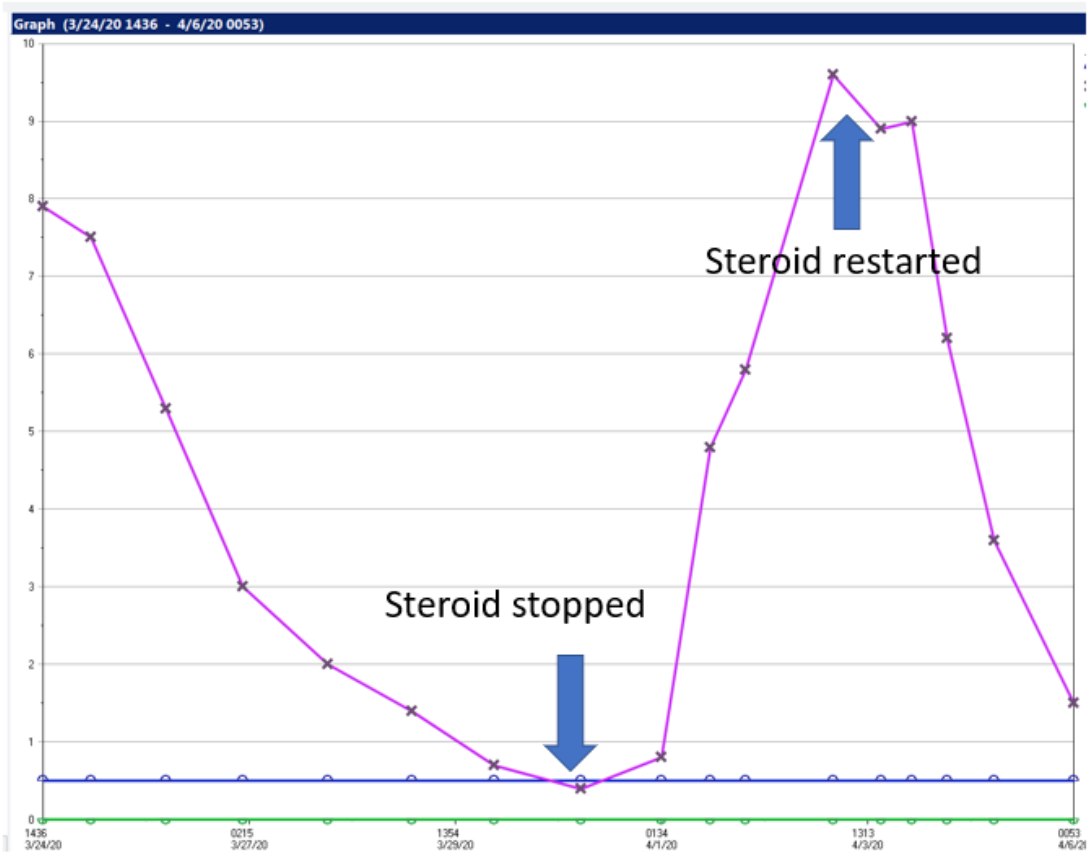


Meta Analysis

24. Salvage Treatments

- High dose bolus corticosteroids; 250–500 mg/day methylprednisolone [154,156] Plasma exchange [213–219]. Should be considered in patients with progressive oxygenation failure despite corticosteroid therapy as well as in patients with severe MAS. Patients may require up to 5 exchanges. FFP is required for the exchange; giving back "good humors" appears to be more important than taking out "bad humors".
- In patients with a large dead-space ventilation i.e. high $PaCO_2$ despite adequate minute ventilation consider "Half-dose rTPA" to improve pulmonary microvascular blood flow; 25mg of tPA over 2 hours followed by a 25mg tPA infusion administered over the subsequent 22 hours, with a dose not to exceed 0.9 mg/kg followed by full anticoagulation.[220,221]
- ECMO [222,223]. Unlike "typical ARDS" COVID-19 patients do not progress into a resolution phase. Rather, patients with COVID-19 may progress to a severe fibro-proliferative phase and ventilator dependency. ECMO in these patients would likely serve little purpose. ECMO however may improve survival in patients with severe single organ failure (lung) if initiated within 7 days of intubation. [224]
- Combination inhaled nitric oxide (or epoprostenol) and intravenous almitrine. The combination of inhaled nitric oxide, a selective pulmonary vasodilator, and almitrine, a specific pulmonary vasoconstrictor, may improve the severe V/Q mismatch in patients with severe COVID-19 "pneumonia". [225–228]

Figure 6. Premature discontinuation of corticosteroids and IV vitamin C (after 4 day) and the effect of reinitiation of this combination on the CRP profile.



Salvage treatments of unproven/no benefit.

- Convalescent serum/monoclonal antibodies: the role and timing of convalescent serum and monoclonal antibodies are uncertain. [229–232] Two RCT's failed to demonstrate any clinical benefit with convalescent serum. [204,205] In addition, Eli Lilly recently announced that they are suspending their ACTIV-33 clinical trial as their monoclonal antibody failed to demonstrate a clinical benefit in hospitalized patients. It is noteworthy that the only RCT demonstrating efficacy of convalescent plasma for an infectious disease was conducted more than 40 years ago, for treating Argentine hemorrhagic fever. [211] Furthermore, giving antibodies directed against SARS-CoV-2 appears pointless when the virus is already DEAD (pulmonary phase). In addition, IgG is a large protein which penetrates tissues poorly, and is unlikely to achieve submucosal concentrations required for mucosal immunity.[233] And lastly, COVID-19 pulmonary disease is immune mediated, and it would therefore appear paradoxical to enhance the antibody response with convalescent serum. [234]
- Janus Kinase inhibitors downregulate cytokine expression and may have a role in this disease. [235–237]

- In patients with progressive fibrosis the combination of anti-fibrotic therapy with corticosteroids should be considered. [238–241] It should however be recognized that unlike all the medications in the MATH+ protocol, pirfenidone and nintedanib have complex side-effects and drug interactions and should be prescribed by pulmonary physicians who have experience with these drugs.
- CVVH/D with cytokine absorbing/filtering filters [242,243] This treatment strategy appears to have a very limited role.

25. Treatment of Macrophage Activation Syndrome (MAS)

- A sub-group of patients will develop MAS, particularly those patients with severe COVID-19 disease.[244] While the pathophysiology of MAS in the setting of COVID-19 is unclear this appears to be driven by SARS-CoV-2 induced inflammasome activation and increased IL-18 production as well as increased GM-CSF and INFγ production. [245–248] The role of IL-1 and IL-6 in the pathogenesis of MAS is unclear.
- A ferritin > 4400 ng/ml is considered diagnostic of MAS. Other diagnostic features include increasing AST/ALT and CRP and progressive multi-system organ failure.[249]
- "*High dose corticosteroids*." Methylprednisolone 120 mg q 6–8 hourly for at least 3 days, then wean according to Ferritin, CRP, AST/ALT (see Figure 8). Ferritin should decrease by at least 15% before weaning corticosteroids.
- Consider plasma exchange.
- The role of inhibition of IL-1 (Anakinra) and IFNγ (emapalumab) is unclear (NCT04324021).

26. Monitoring

- On admission: Procalcitonin (PCT), CRP, BNP, Troponins, Ferritin, Neutrophil-Lymphocyte ratio, D-dimer and Mg. CRP and D-dimer are important prognostic markers. A PCT is essential to rule out coexisting bacterial pneumonia.
- Daily: *CRP, Ferritin, D-Dimer and PCT*. CRP and Ferritin track disease severity closely (although ferritin tends to lag behind CRP). Early high CRP levels are closely associated with the degree of pulmonary involvement and the CT score. [250]
- In patients receiving IV vitamin C, the Accu-Chek™ POC glucose monitor will result in spuriously high blood glucose values. Therefore, a laboratory glucose is recommended to confirm the blood glucose levels. [251,252]
- No routine CT scans, follow CXR and chest ultrasound.
- ECHO as clinically indicated; Pts may develop a severe "septic" cardiomyopathy.

Figure 7.

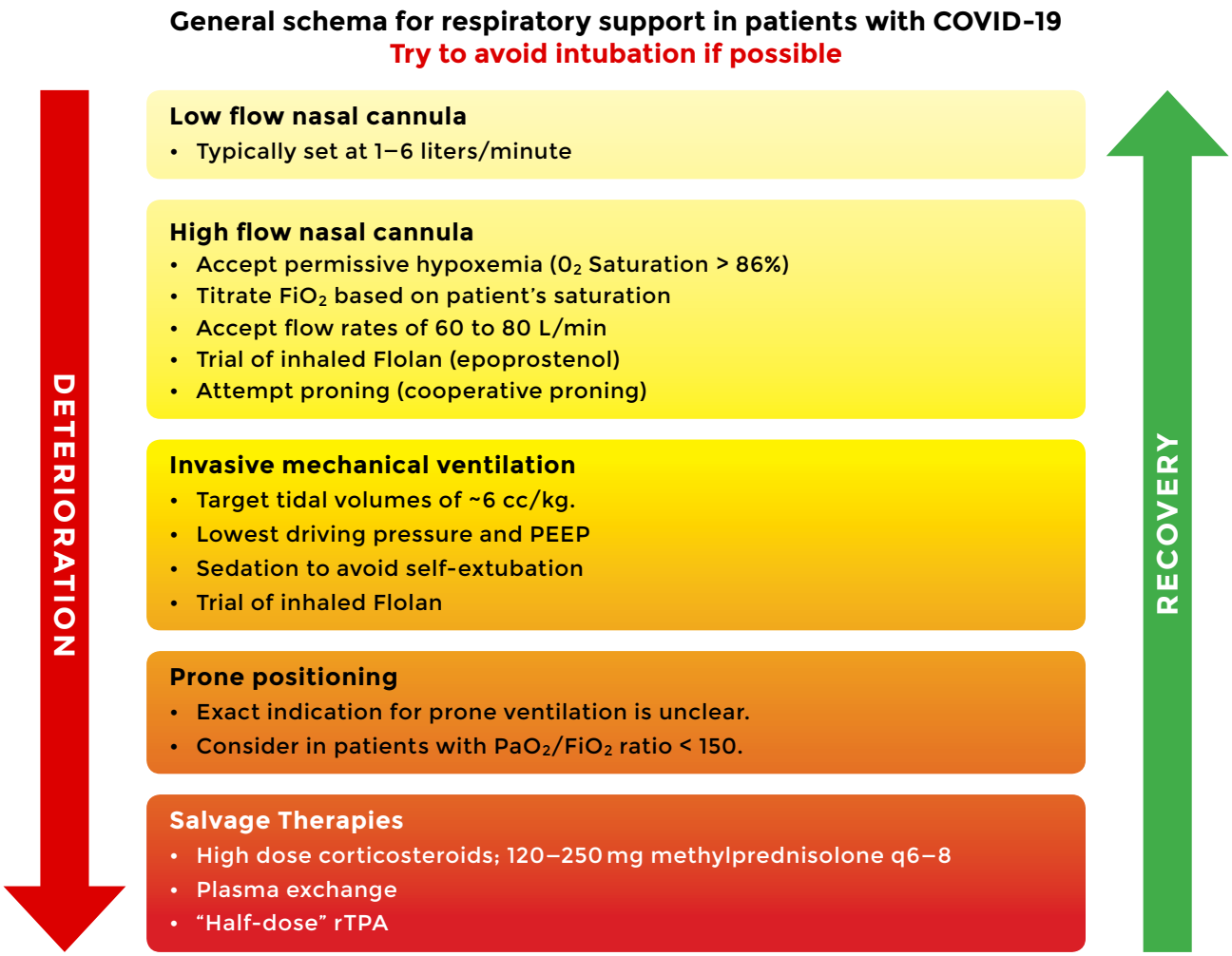
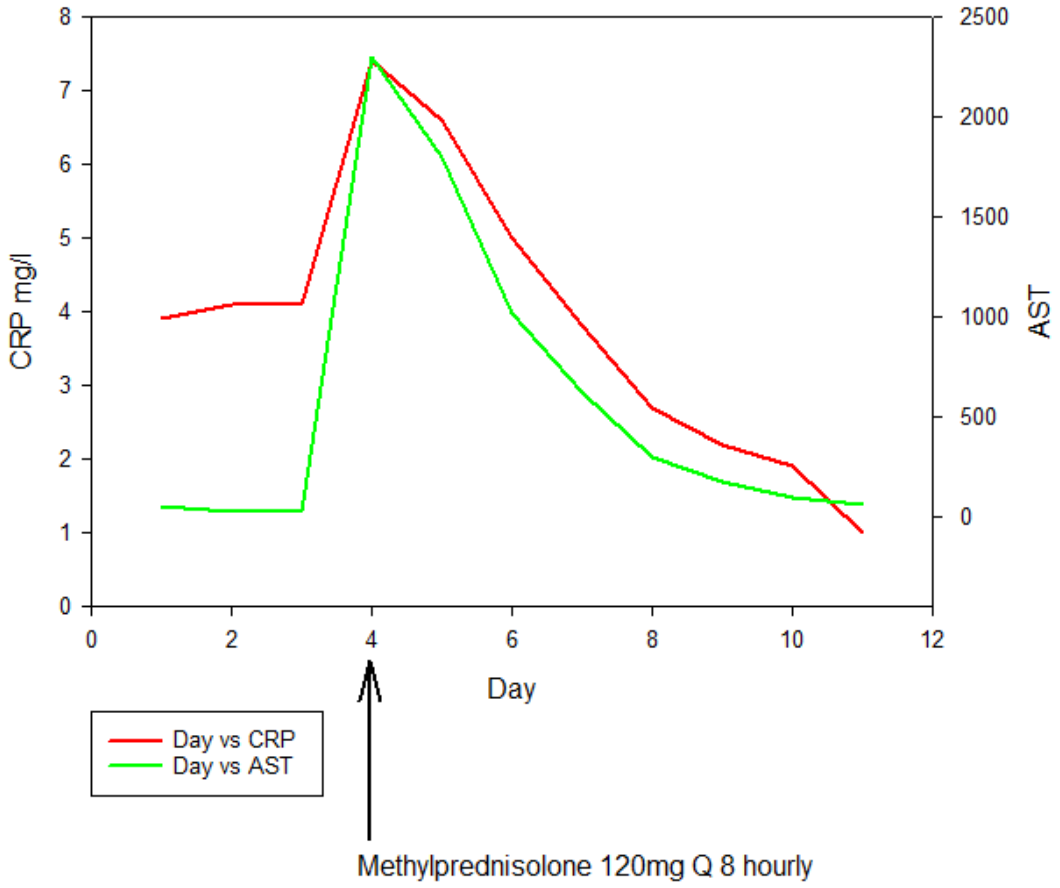

General schema for respiratory support in patients with COVID-19
Try to avoid intubation if possible
DETERIORATION
RECOVERY
Low flow nasal cannula
• Typically set at 1–6 liters/minute
High flow nasal cannula
• Accept permissive hypoxemia (0_2 Saturation > 86%)
• Titrate FiO_2 based on patient's saturation
• Accept flow rates of 60 to 80 L/min
• Trial of inhaled Flolan (epoprostenol)
• Attempt proning (cooperative proning)
Invasive mechanical ventilation
• Target tidal volumes of ~6 cc/kg.
• Lowest driving pressure and PEEP
• Sedation to avoid self-extubation
• Trial of inhaled Flolan
Prone positioning
• Exact indication for prone ventilation is unclear.
• Consider in patients with PaO_2/FiO_2 ratio < 150.
Salvage Therapies
• High dose corticosteroids; 120–250 mg methylprednisolone q6–8
• Plasma exchange
• "Half-dose" rTPA

Figure 8. SARS-CoV-2 induced Macrophage Activation Syndrome (MAS) treated with Vitamin C 3g IV q 6 and increased methylprednisolone (125 mg q 8 hourly)



27. Post ICU management

a. Enoxaparin 40–60 mg s/c daily
b. Methylprednisolone 40 mg day, then wean slowly (follow CRP)
c. Vitamin C 500 mg PO BID
d. Melatonin 3–6 mg at night
e. Vascepa, Lovaza or DHA/EPA 4g day (important for resolution of inflammation)

28. Post Hospital Discharge management

a. Patients have an increased risk of thromboembolic events post-discharge. [253] Extended thromboprophylaxis (? with a DOAC) should be considered in high risk patients. Risk factors include:[254]
    i. Increased D dimer (> 2 times ULN)
    ii. Increased CRP (> 2 times ULN) [255]
    iii. Age > 60
    iv. Prolonged immobilization

b. The *post-COVID-19 syndrome*, is characterized by prolonged malaise, headaches, generalized fatigue, painful joints, dyspnea, chest pain and cognitive dysfunction.[256–258] Up to 50% of patients experience prolonged illness after Covid-19. The post-COVID-19 syndrome may persistent for months after the acute infection and almost half of patients report reduced quality of life. The neurological symptoms may be related micro- and/or macrovascular thrombotic disease which appears to be common in severe COVID-19 disease.[244] Brain MRIs' 3 months post-infection demonstrated micro-structural changes in 55% of patients. [259] Similar to patients who have recovered from septic shock, [260] a prolonged (many months) immune disturbance with elevated pro- and anti-inflammatory cytokines may contribute to the post-COVID-19 syndrome. Consequently, A CRP should be measured prior to discharge and a tapering course of corticosteroids should be considered in those with an elevated CRP. It should be noted that much like omega-3 fatty acids corticosteroids have been demonstrated to increase expression of pro-resolving lipids including Protectin D1 and Resolvin D4.[261] Other interventions that should be considered include:
    i. Vascepa, Lovaza or DHA/EPA 4g day; important for resolution of inflammation by inducing resolvin production. [87,88]
    ii. Atorvastatin 40 mg daily (increase resolvin synthesis) [262]
    iii. Continue melatonin for its antioxidant properties and stabilization of the circadian rhythms.
    iv. Multivitamin with adequate vitamin D.
    v. Recently Ivermectin has been reported to have a role in the treatment of post-Covid-19 syndrome (long haulers).[263] The anti-inflammatory properties of ivermectin may mediate this benefit.

c. *Post-COVID-19 pulmonary fibrosis.* An unknown number of patients who have recovered from COVID-19 organizing pneumonia will develop pulmonary fibrosis with associated limitation of activity. These patients should be referred to a pulmonologist with expertise in pulmonary fibrosis. Anti-fibrotic therapy may have a role in these patients, [238–241] however additional data is required before this therapy can be more generally recommended.

29. Maintaining mental health and the avoiding the misinformation pandemic

'*Misinformation on the Coronavirus might be the most contagious thing about it"*
Dr. Tedros, WHO Director General

- The Panic and misinformation spread by Social Media travels faster than the pandemic itself. What you can do?
    - Avoid social media as much as possible; excess social media exposure increases the likelihood of anxiety and depression[264]
    - Read the news/information from reliable sources (if you can find one)
    - Have a designated time for checking information
    - People share false claims about COVID-19 partly because they simply fail to think sufficiently about whether or not the content is accurate when deciding what to share. [265]
    - Stay connected to positive people! Remotely!
    - Have a plan for staying in touch with family and friends
    - Identify positive influencers…limit contact with other "worriers"
    - Isolation can cause rumination/anxious thinking to escalate
    - Maintain a sense of *hope, humanity and kindness toward others*
    - Seek professional help if anxiety is overwhelming
- Recognize the things you can control
    - WEAR A MASK when in contact with others
    - Establish social distancing; stand/sit about 6 feet away from others
    - Limit attendance at large gatherings
    - Eliminate your contact with those who are ill
    - DON'T go to work or school if you are sick
    - Practice self-care
        - Good sleep, balanced diet, exercise
        - Mindfulness/Meditation/Relaxation activities

Key Concepts of the FLCCC Alliance Treatment Protocol

This is a very complex disease; many of the mysteries are still unravelling. However, a number of concepts are key to the management of this "treatable disease; they include.

1. Patients transition through a number of different phases (clinical stages). The treatment of each phase is distinct ... this is critically important (see Figures 1 & 2).
2. Antiviral therapy is likely to be effective only during the viral replicative phase whereas anti-inflammatory therapy is expected to be effective during the pulmonary phase and possibly the post-COVID-19 phase. While Remdesivir is a non-specific antiviral agent that targets RNA viruses, it is likely that agents specifically designed to target SARS-CoV-2 will be developed.
3. The SARS-CoV-2 PCR remains positive for at least 2 weeks following detection of whole virus (by culture, See figure 3). Patients who progress to the pulmonary phase are usually PCR positive despite cessation of viral replication (and are therefore less likely to be infectious).
4. Due to the imperfect sensitivity of the PCR test as many as 20% of patients who progress to the pulmonary phase will be PCR negative (even on repeat testing). At symptom onset PCR will be positive in approximately 60% of patients; maximal positivity rate is on day 8 (post infection) when 80% of patients will be positive (see Figure3). [266]
5. Symptomatic patients are likely to be infectious during a narrow window starting 2–3 days before the onset of symptoms and to up to 6 days after the onset of symptoms (see Figure 3).[267]
6. It is important to recognize that COVID-19 patients present with a variety of phenotypes, likely dependent on inoculum size and viral load, genetic heterogeneity mutations and polymorphisms, biotypes, blood type, sex and androgen status, age, race, BMI (obesity), immunological and nutritional status, and co-morbidities.[149,268–278] The phenotype at presentation determines the prognosis and impacts the optimal approach to treatment.
7. The pulmonary phase is characterized by immune dysregulation, [235,237,244,247,248,271, 279–288] a pulmonary microvascular injury (vasculopathy),[244,288–291] with activation of clotting and a pro-coagulant state together with the characteristics of an organizing pneumonia. [292,293]
8. Endothelial damage and an imbalance of both innate and adaptive immune responses, with aberrant macrophage activation, plays a central role in the pathogenesis of the severe COVID-19 Disease. [244]
9. As patients, progress down the pulmonary cascade the disease becomes more difficult to reverse. The implications of this are twofold.
    a. Early treatment (of the pulmonary phase) is ESSENTIAL to a good outcome.
    b. Treatment in the late pulmonary phase may require escalation of the dose of corticosteroids as well as the use of salvage methods (i.e. plasma exchange). However, patients who present in the late pulmonary phase may have progressed to the irreversible pulmonary fibroproliferative phase (see Figure 9).
10. The pulmonary phase of COVID-19 is a treatable disease; it is inappropriate to limit therapy to "supportive care" alone. Furthermore, it is unlikely that there will be a single "silver bullet" to treat severe COVID-19 disease. Rather, patients will require treatment with multiple drugs/interventions that have synergistic and overlapping biological effects. Repurposed FDA approved drugs that are safe, inexpensive, and "readily" available are likely to have a major therapeutic effect on this disease. The impact of COVID-19 on middle- and low-income countries is enormous; these countries are not able to afford expensive propriety "designer" molecules.
11. The radiographic and pathological finding of COVID-19 lung disease are characteristic of a secondary organizing pneumonia (and not ARDS). [292,294,295]

12. THIS is NOT ARDS (at least initially). The initial pulmonary phase neither looks like, smells like nor is ARDS.[296–298] The ground glass infiltrates are peripheral and patchy, [294] and do not resemble the dependent air space consolidation (sponge/baby lung) seen with "typical ARDS".[299] Extravascular lung water index (EVLWI) is normal or only slightly increased; this by definition excludes non-cardiogenic pulmonary edema (ARDS). Lung compliance is normal (this excludes ARDS). Patients are PEEP unresponsive. Treating patients as if they ARDS is a very dangerous approach. The hypoxia is due to severe ventilation/perfusion mismatch likely due to the microvascular narrowing, thrombosis and vasoplegia.
13. The core principles of the pulmonary phase (MATH+) is the use of anti-inflammatory agents to dampen the "cytokine storms" together with full anticoagulation to limit the microvascular and macrovascular clotting and supplemental oxygen to help overcome the hypoxia.
14. Ivermectin has emerged as the "*wonder drug*" to prophylaxis and treat COVID-19. Ivermectin inhibits viral replication and has potent anti-inflammatory properties. Emerging clinical data (including RCT's) suggest that ivermectin may have an important clinical benefit across the spectrum of phases of the disease, i.e pre-exposure prophylaxis, postexposure prophylaxis, during the symptomatic phase and during the pulmonary phase. [1–5,62,64–74] [1–3,64,67–74,129–131,177–184] In the recommended dosages, Ivermectin is remarkably safe (see Table 1 and Fig 5). However, as noted above there is the potential for serious drug-drug interaction. Additional, studies are urgently required to confirm these very impressive preliminary findings.
15. The pulmonary phase of COVID-19 is characterized by PROLONGED immune dysregulation that may last weeks or even months. The early and abrupt termination of anti-inflammatory agents will likely result in rebound inflammation (see Figure 8).[300]
16. SARS-CoV-2 as compared to all other respiratory viruses, upregulates cytokines and chemokines while at the same time down regulating the expression of Interferon alpha (the hosts primary antiviral defence mechanism). [131,155] Low innate antiviral defenses and high pro-inflammatory mediators contribute to ongoing and progressive lung injury.
17. Patients in whom the cytokine storm is not "dampened" will progress into the "H phenotype" characterized by poor lung compliance, severe oxygenation failure and PEEP recruitability (see Figure 9). Progression to this phase is exacerbated by ventilator induced lung injury (VILI). The histologic pattern of the "H Phenotype" is characterized by an acute fibrinous and organizing pneumonia (AFOP), with extensive intra-alveolar fibrin deposition called fibrin "balls" with absent or minimal hyaline membranes.[273,295,301–303] Corticosteroids seem to be of little benefit in established AFOP. High dose methylprednisolone should be attempted in the "early phase" of AFOP, however many patients will progress to irreversible pulmonary fibrosis with prolonged ventilator dependency and ultimately death.
18. An unknown percentage of patients with COVID-19 present with "silent hypoxia" with a blunted respiratory response. This phenomenon may be related to involvement of chemoreceptors of the carotid bodies and/or brain stem dysfunction,[304,305] and necessitates pulse oximetry in symptomatic patients managed at home (as discussed above).
19. It should be recognized that LWMH has non-anticoagulant properties that are likely beneficial in patients with COVID-19, these include anti-inflammatory effects and inhibition of histones.[306] in addition, in vitro studies demonstrate that heparin inhibits SARS-CoV-2 interaction with the ACE-2 receptor and viral entry,[307,308] as well as viral replication [72,133]. Most importantly LWWH inhibits heparanase (HPSE).[309] HSE destroys the endothelial glycocalyx increasing endothelial leakiness, activating clotting and potentiating endothelialitis.[309] HPSE levels have been reported to be increased in patients with severe COVID-19 infection. [310]
20. Due to the ease of administration, greater anti-Xa activity and better safety profile we prefer low molecular weight heparin (LMWH) to unfractionated heparin (UFH).

21. The combination of steroids and ascorbic acid (vitamin C) is essential. Both have powerful synergistic anti-inflammatory actions. [165,173] Vitamin C protects the endothelium from oxidative injury.[166,311–313] Furthermore, vitamin C Increases the expression of interferon-alpha [26] while corticosteroids (alone) decease expression of this important protein. [314–317] It should be noted that when corticosteroids are used in the pulmonary phase (and not in the viral replicative phase) they do not appear to increase viral shedding or decrease the production of type specific antibodies. [151,318] It is likely that heparin (LMWH) acts synergistically with corticosteroids and vitamin C to protect the endothelium and treat the endothelialitis of severe COVID-19 disease.
22. Notwithstanding the very important and impressive results of the Recovery-Dexamethasone study, methylprednisolone is the corticosteroid of choice for the pulmonary phase of COVID-19. This is based on pharmacokinetic data (better lung penetration),[319] genomic data specific for SARS-CoV-2,[320] and a long track record of successful use in inflammatory lung diseases. (see Table 1)
23. For prophylaxis and treatment of the early symptomatic phase we suggest the combination of Quercetin (a plant polyphenol), Vitamin C and Zinc. This is based on intriguing basic science data which indicates that:
    a. Zinc is essential for innate and adaptive immunity.[52] In addition, Zinc inhibits RNA dependent RNA polymerase *in vitro* against SARS-CoV-2 virus.[51]
    b. Quercetin has direct viricidal properties against a range of viruses, including SARS-CoV-2, and is a potent anti-oxidant and anti-inflammatory agent. [24,29,34,34,321–328] In addition, quercetin acts as a zinc ionophore. [329]
    c. Vitamin C improves the potency of Quercetin and has antiviral and anti-inflammatory activity.[24]
24. It should also be noted that Vitamin D may be a very powerful prophylactic and treatment strategy against COVID-19. Vitamin D deficiency explains, in part, the enormous geographic variation in mortality of this disease. [11,330]

Figure 9. The consequences of "steroid" avoidance". CT scan after 23 days of "supportive care" demonstrating the late fibroproliferative (irreversible) phase of COVID-19 lung disease (Image kindly provide by Dr. Pierre Kory, from NYC).

Scientific Rationale for MATH+ Treatment Protocol (pulmonary phase)

Three core pathologic processes lead to multi-organ failure and death in COVID-19:

1) **Hyper-inflammation ("Cytokine storm") –** a dysregulated immune system whose cells infiltrate and damage the lungs as well as other organs including the heart and bone marrow. It is now widely accepted that SARS-CoV-2 causes aberrant T lymphocyte and macrophage activation resulting in a "cytokine storm." [235,237,247,248,271,279,281–287] In addition, post-mortem examination has demonstrated features of the "macrophage activation syndrome", with hemophagocytosis and a hemophagocytic lymphohistiocytosis-like disorder.[244]
2) **Hyper-coagulability (increased clotting)** – the dysregulated immune system damages the endothelium and activates blood clotting, causing the formation of micro and macro blood clots. Clotting activation may occur directly due to increased expression of Factor Xa as well as endothelial injury with the release of large aggregates of van Willebrand factor.[77] These blood clots impair blood flow. [134,135,137–145,290,291,331,332] It should be noted that the thrombotic microangiopathy appears to target predominantly the pulmonary and cerebral circulation. [244]
3) **Severe Hypoxemia (low blood oxygen levels)** –lung inflammation caused by the cytokine storm, together with microthrombosis in the pulmonary circulation severely impairs oxygen absorption resulting in oxygenation failure.

The above pathologies are not novel, although the combined severity in COVID-19 disease is considerable. Our long-standing and more recent experiences show consistently successful treatment if traditional therapeutic principles of ***early and aggressive intervention*** is achieved, before the onset of advanced organ failure. It is our collective opinion that the historically high levels of morbidity and mortality from COVID-19 is due to a single factor: the widespread and inappropriate reluctance amongst hospitalists and intensivists to employ anti-inflammatory and anticoagulant treatments, including corticosteroid therapy *early in the course of a patient's hospitalization.* It is essential to recognize that it is not the virus that is killing the patient, rather it is the patient's overactive immune system. [234,237,244,305] Autopsy studies have demonstrated minimal viral cytopathic effects.[244,305] The flames of the "cytokine fire" are out of control and need to be extinguished. Providing supportive care (with ventilators that themselves stoke the fire) and waiting for the cytokine fire to burn itself out simply does not work… this approach has FAILED and has led to the death of tens of thousands of patients.

"If what you are doing ain't working, change what you are doing" – PEM

The systematic failure of critical care systems to adopt corticosteroid therapy (early in this pandemic) resulted from the published recommendations against corticosteroids use by the World Health Organization (as recent as May 27th 2020) [333,334]. This recommendation was then perpetuated by the Centers for Disease Control and Prevention (CDC), the American Thoracic Society (ATS), Infectious Diseases Association of America (IDSA) amongst others. A publication authored one of the members of the Front Line COVID-19 Critical Care (FLCCC) Alliance (UM), identified the errors made by these organizations in their analyses of corticosteroid studies based on the findings of the SARS and H1N1 pandemics.[146,335] Their erroneous recommendation to avoid corticosteroids in the treatment of COVID-19 has led to the development of myriad organ failures which have overwhelmed critical care systems across the world and led to excess deaths. The recently published results of the RECOVERY-DEXAMETHASONE study provide definitive and unambiguous evidence of the lifesaving benefits of corticosteroids and strong validation of the MATH + protocol. It should be recognized that corticosteroids are the only therapy proven to reduce the mortality in patients with COVID-19.[336] The

RECOVERY-DEXAMETHASONE study, randomized 2104 patients to receive dexamethasone 6 mg (equivalent to 32 mg methylprednisolone) once per day (either by mouth or by intravenous injection) for ten days and were compared with 4321 patients randomized to usual care alone.[123] Dexamethasone reduced deaths by one-third in ventilated patients (rate ratio 0.65 [95% confidence interval 0.48 to 0.88]; p=0.0003) and by one fifth in other patients receiving oxygen only (0.80 [0.67 to 0.96]; p=0.0021). There was no benefit among those patients who did not require respiratory support (1.22 [0.86 to 1.75; p=0.14). The results of this study STRONGLY support the EVMS/MATH+ protocol which recommends the use of corticosteroids for the "pulmonary phase" of COVID-19. It should be noted that we would consider the non-titratable 'fixed" dose of dexamethasone used in the RECOVERY-DEXAMETHASONE study to be very low. Furthermore, as indicated above we consider methylprednisolone to be the corticosteroid of choice for the treatment of COVID-19 pulmonary disease. The benefit of methylprednisolone in improving respiratory function, ventilator dependency and mortality has been confirmed in a number of observational studies, [147,148,154,318,337–339] as well as a randomized controlled study.[156] It should be recognized that the mortality benefit with methylprednisolone was not replicated in a recent Brazilian RCT. [300] However, in this study methylprednisolone was started relatively late (day 13 after symptom onset), but most importantly was stopped on day 5. This failed study reinforces the concept of early and prolonged treatment with methylprednisolone titrated to the patient's clinical response. In patients at high risk of Strongyloides infection, screening and/or treatment of this parasite with ivermectin is suggested prior to treatment with corticosteroids.[340]

Our treatment protocol targeting the key pathologic processes has been highly successful, *if begun within 6 hours* of a COVID19 patient presenting with shortness of breath and/or arterial desaturation and requiring supplemental oxygen. If such early initiation of treatment could be systematically achieved, the need for mechanical ventilators and ICU beds will decrease dramatically.

Further resources:

The reader is referred to the large autopsy series by Bruce and colleagues which clearly outlines the pathophysiology of severe COVID-19 disease.[244]

The scientific rationale for the MATH + protocol is reviewed in this paper.[163]

In this U-tube video, Professor Britt Glaunsinger, PhD provides an outstanding review on the molecular virology of SARS-CoV-2: https://www.youtube.com/watch?v=DQVpHyvz4no

Lectures by Paul Marik, MD reviewing clinical aspects of COVID-19.
https://www.youtube.com/channel/UCz9Pvn15m4Rv1uY-aBYRVuw

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Término da reprodução de conteudo

An overview of the MATH+ and I-MASK+ Protocols

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MUNICÍPIO DE IPÊ – RS: ESTRUTURA, CARACTERÍSTICAS, POTENCIALIDADES E DESAFIOS

COUNTY OF IPÊ - RS: STRUCTURE, CHARACTERISTICS, POTENTIALITY, AND CHALLENGES

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RESUMO

Introdução: A presente entrevista com o Sr. Prefeito do município de Ipê, versa sobre as atividades do município, e os desafios da atualidade. **Objetivo:** analisar as potencialidades do município; efeitos do covid-19 e questões de desenvolvimento estratégico. **Métodos:** a entrevista foi estruturada em três tópicos gerias: Apresentação do prefeito e do município; efeitos do covid-19; e, desenvolvimento estratégico do município. **Resultados e Discussão:** As dificuldades presentes no município são presentes em diversos outros. As soluções propostas também podem, após devidamente adaptadas, servir a outros municípios. O município possui uma distribuição proporcional entre a população urbana e rural. A covid-19 impactou negativamente o desempenho econômico do município. Dentre os processos de desenvolvimento planejados existe a criação de um distrito industrial. **Conclusões:** a pandemia atrapalha os negócios e atrasa o desenvolvimento educacional do município, da mesma forma que em outras regiões. O município apresenta grande potencial de desenvolvimento socioeconômico.

Palavras-chave: *desenvolvimento urbano, pandemia, atividades econômicas.*

ABSTRACT

Background: The present interview with the Mayor of the city of Ipê deals with the activities of the county and its challenges. **Aim**: to analyze the potential of the city, effects of covid-19, and strategic development issues. **Methods**: the interview was structured in three general topics: Presentation by the mayor and the county; effects of covid-19; and strategic development of the county. **Results and Discussion**: The difficulties present in the county are seen in several others. The proposed solutions can also, after being adequately adapted, serve other counties. The county has a proportional distribution between the urban and rural populations. Covid-19 negatively impacted the municipality's economic performance. Among the planned development processes, there is the creation of an industrial district. **Conclusions**: the pandemic hinders business and delays the municipality's educational development in the same way as in other regions. The county has great potential for socio-economic development.

Keywords: *urban development, pandemic, economic activities*.

Os editores do JLPPHS tiveram a oportunidade de entrevistar o Senhor Prefeito do município de Ipê, no Rio Grande do Sul.

Bloco 1. Apresentação do Prefeito e do município.

Cassiano De Zorzi Caon

1. Sr. Prefeito Cassiano Caon, por favor, fale para nós um pouco de sua trajetória política. Qual partido o senhor representa? Há quantos anos o senhor atua na política? Como Prefeito eleito recentemente como foi a experiencia de disputar uma eleição?

Represento o partido do MDB. Sou filiado há aproximadamente 30 anos. Iniciei como membro do diretório municipal até tornar-me Presidente do MDB do município de Ipê. No ano de 2017 fui eleito o vereador mais votado da Legislatura 2017-2020. Foi um aprendizado inenarrável. A experiência adquirida no contato com a população trouxe um amadurecimento transformador e crescente pelo interesse público.

2. Qual a atual composição da câmara de vereadores?

A Câmara de Vereadores de Ipê é composta por 09 (nove) vereadores, dividida em 03 (três) bancadas. Bancada do PP com 04 (quatro) vereadores, bancada do MDB com 04 (quatro) vereadores e 01 (uma) vereadora do PDT.

a. **Quais os principais temas em votação na Câmara de vereadores atualmente?**

A maioria são projetos do executivo como pedido de créditos suplementares, convênios como com o Hospital São José, a APAE, Arca de Noé, Bombeiros, projetos para contratações em caráter emergencial devido a Lei 173 de 27/05/2020.

b. **Como estes tópicos irão contribuir para o desenvolvimento do munícipio?**

São projetos e convênios que atendem à demanda do Município contribuindo diretamente para o desenvolvimento de diversos setores.

3. Sr. Prefeito Cassiano Caon, com relação ao município de Ipê, qual o tamanho do município?

Área de 599,361 km².

a. **Qual o tamanho da população urbana e rural?**

Total de 6 689 hab. A proporção de população urbana e rural é praticamente igual.

b. **Qual o PIB do município?**

PIB per capita R$ 29.864,74.

c**. Quantas escolas o município possui?**

Três estaduais e quatro municipais.

d. **Quais os principais parques e praças presentes no município?**

Temos o Parquinho de Brinquedos na praça da Vila São Paulo, o Parquinho da Praça Central, em frente à Paróquia São Luiz Rei, uma academia ao ar livre na Escola Leonel Brizola,

uma academia ao ar livre no Caravaggio (que será reformada), uma academia ao ar livre e Parquinho de brinquedos na Praça da Vila Segredo. As principais praças são a da Paróquia São Luiz Rei, a da emancipação, e a da Vila São Paulo. A praça da Vila Segredo é da Igreja São Pedro.

e. **Há algum museu ou biblioteca pública no município?**

Sim, museu e biblioteca.

f. **Quais os principais festivais ou eventos disponíveis no município?**

Expoipê, Festipê, Rodeio Crioulo, Escolha das Soberanas de Ipê e as Festas das Capelas do Município.

g. **Como está estruturado o sistema de saúde do município?**

O sistema de saúde do nosso Município está estruturado com três Unidades Básicas de Saúde e três equipes de Estratégia de Saúde da Família, todas com médicos, enfermeiros, técnicos e/ou auxiliares de enfermagem e 100% do nosso território coberto com Agentes Comunitárias de Saúde. Das três equipes, duas delas contam com a saúde bucal instalada. Além disso, possuímos dois médicos clínicos de apoio e uma médica ginecologista. Contamos também com os serviços profissionais de psicologia, nutrição e fisioterapia. Possuímos responsáveis pelas vigilâncias Epidemiológica e Sanitária, além de uma agente de combate a endemias. Nosso Município conta com uma farmácia de medicamentos básicos e especiais, além do setor de regulação e transporte.

Para atendimento de sintomáticos respiratórios, nosso Município conta com uma Ala de atendimento Covid, anexa a Unidade Básica de Saúde Centro, composta com profissional médico, enfermeiro e técnico em enfermagem.

h. **Ao assumir a prefeitura do município de Ipê qual foi o montante de dinheiro disponibilizado em caixa e qual o valor dos compromissos previamente assumidos? O saldo era positivo ou negativo?**

O montante de recurso livre foi de R$ 160.193,40 e recursos vinculados de R$ 2.441.632,20. O valor dos compromissos previamente assumidos foi de R$ 731.484,73. O saldo era **positivo**.

i. **Quais as principais potencialidades do município?**

Agronegócio, turismo, agricultura ecológica e comércio.

j. **Como é estruturada a coleta de resíduos em Ipê?**

A coleta de resíduos é realizada por empresa terceirizada de forma seletiva, com caminhões compactadores, sendo que a mesma possui estação de transbordo e destinação final para aterro sanitário licenciado. Reciclagem Serrana Eireli ME CNPJ: 17.793.462/0001-06, Endereço: DT Linha Caçador, s/nº, Nova Bassano – RS. Telefone 54 3477 485 (Rogério).

k. **Qual o percentual de resíduos que é reciclado no município?**

Em torno de 28%.

l. **Os resíduos orgânicos são convertidos em adubos neste município? Em caso negativo, qual o destino dado aos resíduos?**

Não. Encaminhado para aterro sanitário licenciado.

m. **Quais as principais fontes de renda do município?**

Agropecuária (cereais, fruticultura, aves, suínos e bovinos). Indústria, Comércio e Prestação de serviços.

n. **No aspecto industrial, quais os principais produtos fabricados em Ipê?**

Fabricação de abertura de madeiras de ferro, indústria têxtil, móveis, agroindústrias, produção de tijolos, caixarias para frutas, *embalagem e comércio de frutas.

o. **No aspecto rural, quais os principais produtos agrícolas?**

Cereais de inverno e verão, frutas de semente e caroço, pequenas frutas, leite, hortifrutigranjeiros como um todo, bovinos de

corte e leite, aves e suínos.

Ipê é considerada a Capital Nacional da Agroecologia.

p. **Quais os principais meios de comunicação disponíveis no município?** (jornais, youtube channels, radio, outros)

Rádio Solaris e Jornal Ipê em notícia.

Bloco 2. COVID-19 – Impactos e desafios.

4. Como o COVID-19 afetou a economia local?

Embora a maior parte da economia do município gire em torno da agricultura, o comércio foi bastante afetado. Como os bares, restaurantes e autônomos tiveram que fechar seus estabelecimentos, a renda deles ficou comprometida.

5. Qual o impacto previsto do COVID-19 na educação municipal? É possível estimar o prejuízo econômico que este ano perdido trará ao desenvolvimento do município?

Como consequência na educação acontecerá a acentuação da desigualdade devido as condições de acesso, causando um déficit de aprendizagem ainda maior, podendo ocasionar a exclusão e o aumento de taxas de reprovação e abandono. Não conseguimos mensurar.

6. Até o presente momento, quantas pessoas vieram a falecer no município em virtude do COVID-19?

Quatro óbitos

7. O município adota o tratamento do *MATH+ protocol* ou equivalente? <referencia: https://covid19criticalcare.com/math-hospital-treatment/pdf-translations/>

Nosso Município não adotou este protocolo, mas estamos atentos aos novos procedimentos que estão surgindo.

8. **Como estão sendo tratados os doentes no município?**

A adoção do isolamento domiciliar de todos os casos de sintomáticos respiratórios ou casos suspeitos da Covid, assim como seu núcleo familiar. O tratamento é realizado conforme a avaliação clínica do médico, atentando para presença de fatores de risco para agravamento. É realizado monitoramento diário pela equipe de ESF responsável dos casos suspeitos e ativos. Quando necessário são encaminhados ao nosso hospital de referência para realização de exames de imagem e tratamento hospitalar sempre que necessário.

9. O município acredita que o tratamento precoce colabora para evitar a lotação excessiva dos hospitais?

O Município acredita que sim.

10. Após 1 ano de pandemia, o senhor considera a política de *lockdowns* seja a mais eficiente?

Não acredito ser a mais eficiente, visto que, o equilíbrio entre a economia e a saúde é o que deve prevalecer.

Bloco 3.

Desenvolvimento estratégico.

11. Há um distrito industrial no município? Como ele funciona? Quais os atrativos para industrias se instalarem no município?

O município ainda não possui um distrito Industrial, mas já está sendo buscado parcerias para que possa ser criado.

12. Como está a qualidade dos serviços concedidos do município? (telecomunicações, água, luz)

Em relação ao perímetro urbano está de forma satisfatória, porém, na área rural no que tange a comunicações, percebe-se a má qualidade e até mesmo a falta do serviço.

13. Existe no município o potencial para a instalação de alguma PCH? Se sim, qual seria o prazo para a obtenção de licenças na prefeitura?

Existe sim, em torno de 10 unidades em andamento, porém o licenciamento ambiental é buscado no órgão estadual – FEPAM.

14. No setor de telecomunicações, quantas empresas operam em Ipê? Como é a qualidade do serviço?

Quatro empresas operam em Ipê, sendo a qualidade deficitária apenas na área rural.

15. No setor de energia, qual o percentual de energia produzido no município? (incluindo todas as fontes de energia)

No momento não temos dados a informar.

16. Quais os planos que o município está traçando para o desenvolvimento?

O desenvolvimento do município deve ser estruturado na busca de geração de empregos e renda, através da criação de um distrito industrial. A união das entidades representativas e a realização de parcerias público privadas, assim como, investimentos no setor primário.

17. Existe alguma possibilidade da realização de PPPs para dinamizar a economia local? Em caso afirmativo, quais os caminhos a serem seguidos?

Sim, através da união das entidades representativas.

18. Duas rodovias estaduais (ERS-122, RS-437) passam por Ipê, seria possível a construção de um porto seco no município, visando torna-lo em um hub logístico?

Uma PPP para gerenciar o projeto. Sim, existe a possibilidade, mas no momento, o município não dispõe de uma legislação específica.

19. Os rios do município poderiam ser utilizados para a instalação de uma estação de tratamento de água, visando atender o município e até mesmo colaborar com municípios vizinhos?

Sim.

Ilustre Prefeito Caon, os editores do Jornal agradecem a disponibilidade do senhor em nos conceder esta entrevista. Esperamos ter a oportunidade de retornar ao município no futuro e apresentar os novos patamares de desenvolvimento do município de ipê.

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RESEARCH PAPER

ANÁLISE SOCIOECONÔMICA DA ASSOCIAÇÃO DOS CATADORES DE MATERIAIS RECICLÁVEIS DE CAJAZEIRAS (ASCAMARC) E A CONTRIBUIÇÃO DA ATIVIDADE DE CATAÇÃO PARA O MEIO AMBIENTE

SOCIOECONOMIC ANALYSIS OF THE ASSOCIATION OF COLLECTORS OF RECYCLABLE CAJAZEIRAS MATERIALS (ASCAMARC) AND THE CONTRIBUTION OF COLLECTING ACTIVITY TO THE ENVIRONMENT

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RESUMO

Introdução: a reciclagem é uma importante ferramenta para a promoção do desenvolvimento sustentável, pois, a partir do momento em quem são usados mecanismos onde se possa reduzir o uso de matérias-primas virgens estará limitando o uso dos recursos escassos, reduzindo a acumulação progressiva de resíduos; assim como, conter os seus efeitos colaterais e poluições causando problemas de saúde entre outros. Na base do sistema de reciclagem estão os catadores de recicláveis, agentes fomentadores desta atividade que são aqueles (as) trabalhadores (as) que catam, selecionam e vendem os materiais recicláveis, tais como: papel, vidro, metal, lixo e outros materiais reaproveitáveis. **Objetivo:** o objetivo desta pesquisa foi constatar a renda auferida e a contribuição para o processo de desenvolvimento sustentável oriundas da atividade de catação de materiais recicláveis. **Métodos:** o estudo proposto fora realizado na Associação dos Catadores de Materiais Recicláveis de Cajazeiras (ASCAMARC), nesta cidade, Alto Sertão da Paraíba. A população e amostra é formada por 13 catadores de materiais recicláveis, que participam ativamente na ASCAMARC e que aceitaram participar da pesquisa de forma voluntária, após terem sido esclarecidos sobre os objetivos da mesma. Foi utilizado a técnica de análise de conteúdo, por meio das transcrições das entrevistas realizadas junto ao público-alvo e de documentos de fontes secundárias e os dados coletados foram analisados também sob a forma quantitativa. **Resultados e Discussão: o**s resultados encontrados apontam que 12 (92,31%) catadores auferem menos de um salário e 01 (7,69%) catador aufere um salário mínimo através da atividade de catação de material reciclável e que atualmente há uma grande preocupação com os danos gerados ao meio ambiente por resíduos sólidos que apresentam tempo de degradação longo. Foi verificado que 13 (100%) catadores acreditam que a atividade de catação de materiais recicláveis contribui para o meio ambiente. **Conclusões:** conclui-se a partir dos resultados obtidos a importância social, econômica e ambiental do trabalho dos catadores de materiais recicláveis, apesar das condições precárias em que realizam a atividade, sem a participação destes na base da cadeia da reciclagem talvez a situação ambiental se encontrasse mais caótica nos últimos tempos.

Palavras-chave: *Catadores, Emprego e Renda, Materiais Recicláveis, Meio ambiente.*

ABSTRACT

Background: recycling is an essential tool for promoting sustainable development, as mechanisms that reduce the use of virgin raw materials will limit the use of scarce resources and reduce the progressive accumulation of waste. as well as contain their side effects and pollution causing health problems, among others. At the base of the recycling system are the collectors of recyclables, agents of this activity who are the workers who pick, select and sell recyclable materials such as paper, glass, metal, garbage, and other reusable materials. **Aim:** this study aimed to verify the income earned and the contribution to the sustainable development process arising from

collecting recyclable materials. **Methods:** the proposed study was carried out at the Cajazeiras Waste Pickers Association (ASCAMARC), in this city, Alto Sertão da Paraíba. The population and sample are 13 recyclable waste pickers who actively participate in ASCAMARC and voluntarily agreed to participate in the research after being informed about its objectives. The content analysis technique was used through transcripts of interviews with the target audience and documents from secondary sources, and the collected data were also analyzed in quantitative form. **Results and Discussion**: the results show that 12 (92.31%) waste pickers earn less than one wage, and 01 (7.69%) waste pickers earn a minimum wage through the activity of collecting recyclable material and that there is currently great concern about the damage generated to the environment by solid wastes that have a long degradation time. It was found that 13 (100%) waste pickers believe that collecting recyclable materials contributes to the environment. **Conclusions:** It can be concluded from the results obtained the social, economic, and environmental importance of the work of waste pickers, despite the precarious conditions in which they perform the activity, without their participation in the base of the recycling chain, perhaps the environmental situation would be more chaotic in recent times.

Keywords: *Collectors; Employment and Income; Recyclable Materials; Environment.*

1. INTRODUÇÃO:

A problemática ambiental é corriqueira no mundo todo, fato este ocorrido devido ao advento da revolução industrial e da era informática, responsáveis por grandes alterações nos padrões de consumo e produção. Pois, quanto maior o crescimento econômico e atendimento à demanda da sociedade mundial por alimentação, transporte, lazer, moradia e outros, maior será a utilização dos recursos naturais para produção de bens de consumo, a degradação ambiental e, por consequente, as diferenças sociais (Araujo e Arruda, 2011).

Philippi Jr. e Malheiros (2005) corroboram enfatizando que a evolução demográfica mundial observada no último século, quando associada ao ápice na taxa de consumo de recursos naturais e ao processo acelerado de urbanização, sobretudo em países emergentes derivaram no aumento dos índices de poluição urbana, com modificações ambientais de ordem global.

Assim sendo, frente a uma quantidade cada vez maior de resíduo gerada pela atual sociedade de consumo, a falta de locais para colocá-los, as polêmicas da incineração e da localização dos aterros sanitários, reciclar parece ser a chave para um futuro mais limpo e sustentável (Pereira, 2018).

A reciclagem é uma importante ferramenta para a promoção do desenvolvimento sustentável, pois a partir do momento em quem são usados mecanismos onde se possa reduzir o uso de matérias-primas virgens, estará limitando o uso dos recursos escassos, reduzindo a acumulação progressiva de resíduos; assim como, conter os seus efeitos colaterais e poluições causando problemas de saúde entre outros (De Almeida Donato *et al.* 2015).

Logo, a reciclagem é um processo que visa a diminuição da utilização dos recursos escassos e da degradação ambiental através da reutilização de sua matéria-prima para fabricar novos produtos (Lomasso *et al.* 2015). Isto significa que a reciclagem é parte do processo de reaproveitamento do resíduo reciclável, atividade que protege o meio ambiente, reduz os danos causados na saúde da população e colabora para o desenvolvimento sustentável.

A Comissão Mundial sobre Meio Ambiente e Desenvolvimento (CMMAD) criada pela Organização das Nações Unidas (ONU) relata que “desenvolvimento sustentável é o desenvolvimento que encontra as necessidades atuais sem comprometer a habilidade das futuras gerações de atender suas próprias necessidades” (ONU, 2019). Desta forma, desenvolvimento sustentável é a busca da combinação entre o desenvolvimento econômico e a conservação ambiental, melhorando a qualidade do que se produz sem degradar o meio ambiente para que as gerações futuras possam viver bem de acordo com as suas necessidades.

A Agenda 2030, adotada pela ONU, é composta dos Objetivos de Desenvolvimento Sustentável (ODS), sendo estruturados em 17 objetivos e 169 metas a serem alcançados até o ano de 2030. Esta pactuação representa uma convocação universal para melhorar indicadores sociais, ambientais e aprimorar a capacidade de articulação entre as instituições, em prol de um mundo mais justo (ONU, 2019).

O presente trabalho corrobora com os seguintes ODS: 1- Erradicação da pobreza; 8- Trabalho decente e crescimento econômico 10- Redução das desigualdades, 11- Cidades e comunidades sustentáveis e 12- Consumo e produção responsáveis. Estes objetivos promovem a inclusão social, a melhoria da saúde humana e ambiental, além de estarem em acordo

com as atuais transformações tecnológicas e econômicas que ocorrem diariamente na era da Informação, desta forma, a questão da sensibilização ambiental ganha a cada dia mais atenção e espaço nos debates para a construção de uma sociedade sustentável (Philippi Jr. e Malheiros, 2005).

Na base do sistema de reciclagem estão os catadores de recicláveis, agentes fomentadores desta atividade que são aqueles trabalhadores que catam, selecionam e vendem os materiais recicláveis, tais como: papel, vidro, metal, plástico e outros materiais reaproveitáveis. Segundo Nascimento *et al.* (2017) a reciclagem tem como ganho social a geração de emprego e renda aos catadores de materiais recicláveis e como ganho ambiental a preservação do meio ambiente, a partir da redução de resíduos que são de difícil decomposição.

Medeiros e Macêdo (2007) denominam os catadores de '*self-employed proletarians*', segundo os autores, o auto emprego é mera ilusão, pois estes trabalhadores se auto empregam, mas na realidade eles vendem sua força de trabalho à indústria da reciclagem, sem, contudo, terem acesso à seguridade social do mundo do trabalho. Assim sendo, a reciclagem necessita de uma atenção maior, principalmente quando se trata das questões de conservação de recursos naturais e da relevância dos atores sociais envolvidos nesse processo, como por exemplo, os catadores de materiais recicláveis ou agentes ambientais, atuando tanto na conservação do meio ambiente, como na luta pela sua subsistência (Oliveira *et al.* 2011).

De acordo com o Instituto Brasileiro de Geografia e Estatística (IBGE, 2010) não se tem ciência, dentro da escala de valores das categorias profissionais, de nenhuma outra atividade que seja tão estigmatizada e desprestigiada socialmente como o trabalho dos catadores. Assim, em um quadro de vulnerabilidade e exclusão social, emerge a necessidade de estudar esses trabalhadores, muitas vezes menosprezados pelo poder público.

Diante do exposto, o presente trabalho teve como objetivo constatar a renda auferida e a contribuição para o processo de desenvolvimento sustentável oriundas da atividade de catação de materiais recicláveis da Associação dos Catadores de Materiais Recicláveis de Cajazeiras (ASCAMARC).

2. MATERIAIS E MÉTODOS:

2.1. Tipo de pesquisa

Trata-se de uma pesquisa descritiva quanti-qualitativa sob a forma de estudo de caso. Para Barros e Silva (2010) este tipo de pesquisa é suficiente para a análise de um fenômeno, se considerado um caso em particular. Como corrobora Costa e Costa (2013) esse tipo de pesquisa é capaz de interpretar uma determinada população ou fenômeno a partir de suas características.

2.2 Local da investigação

O estudo proposto foi realizado na ASCAMARC, na cidade de Cajazeiras, Alto Sertão da Paraíba. A justificativa para escolha desse local como objeto de estudo deu-se em função da existência de um grupo de pessoas de uma classe social marginalizada pelo mercado de trabalho formal, organizado em forma de associação que têm na coleta de materiais recicláveis uma fonte de renda que lhes asseguram a sobrevivência e a problemática intríseca concernente às condições sociais e de qualidade de vida dos catadores de materiais recicláveis que no município trabalham habitualmente.

2.3 População/ amostra/ critérios de inclusão e exclusão

A população foi formada por 13 associados que participam ativamente da ASCAMARC. A amostra foi composta pelos catadores que aceitaram colaborar com a pesquisa de forma voluntária, após terem sido esclarecidos sobre os objetivos da pesquisa. Participaram da pesquisa aqueles trabalhadores que trabalham ativamente na ASCAMARC e que concordaram em assinar o Termo de Consentimento Livre e Esclarecido (TCLE). Foram excluídos da pesquisa os catadores que não participavam ativamente da ASCAMARC e não assinaram o TCLE.

2.4 Coleta de dados

As fontes utilizadas para a coleta de dados se deram através de duas etapas. A primeira foi à busca de dados e informações relevantes sobre a reciclagem como fonte geradora de renda, sendo estes, objetos de uma investigação realizada em pesquisa bibliográfica com base em material já elaborado como: livros, dissertações e teses, palestras, jornais, revistas, artigos e material obtido pela internet (em que a seleção de estudos foi feita através de artigos científicos selecionados através de busca no banco de dados da SciELO e Portal Capes). A pesquisa dos artigos foi realizada

entre abril e agosto de 2019.

A busca nos bancos de dados foi realizada utilizando algumas palavras-chave, a citar: reciclagem, catadores de materiais recicláveis, emprego, renda. Os critérios de inclusão para os estudos encontrados foram as palavras-chave como título do trabalho ou que estivessem no meio dele, texto completo, idioma em português e ano de publicação no período de 2002 a 2019. Foram excluídos os estudos que não eram em português, que estavam fora do período selecionado, trabalhos duplicados, onde as palavras-chave eram apenas citadas no texto.

A segunda etapa foi desenvolvida pela realização de um estudo de caso, para obtenção de informações a partir das entrevistas (com base em roteiros previamente elaborados) com os principais atores representativos da associação, bem como as informações oriundas da observação direta durante a entrevista, com o intuito de caracterizar a atividade de catação de materiais recicláveis como geradora de emprego e renda e promotora do desenvolvimento sustentável.

2.4.1 Instrumentos e técnicas

Na ASCAMARC, no mês de maio de 2019, foi realizada a entrevista de forma semiestruturada, isto é, com perguntas abertas e fechadas. Além disso, foram importantes para compreensão, a gravação das falas dos catadores, as anotações durante a entrevista – para se extrair as informações explícitas e implícitas evitando assim o resumo ou paráfrase das respostas dos entrevistados – e registros fotográficos obtidos durante a visita de campo.

2.5 Análise de dados/ resultados

Para o presente estudo foram utilizadas a técnica de análise de conteúdo – por meio das transcrições das entrevistas realizadas junto ao público-alvo e de documentos de fontes secundárias – e a representação gráfica – através de tabelas. Para Gerhardt e Silveira (2009) a análise de conteúdo leva a conectar a interpretação dos dados coletados e a sua inter-relação com o grupo estudado e uni-los com os elementos que determinam suas características.

3. RESULTADOS E DISCUSSÃO:

Os dados foram analisados quantitativamente e qualitativamente, apresentados por meio de tabelas com valores absolutos e percentuais e em seguida foram discutidos à luz da literatura pertinente ao tema proposto. Consoante Tabela 1, quanto à caracterização por gênero, constata-se que a maioria é do gênero masculino, mas também se observa um percentual considerável de mulheres exercendo a atividade de catação, sobretudo pelo fato das mesmas precisarem ajudar com as despesas da casa, ou também, ser a atividade a qual, obtém o seu sustento.

Tabela 1. *Caracterização sociodemográfica dos catadores de materiais recicláveis*

Características sociodemográficas	Quantidade	(%)
Gênero		
Masculino	09	69,23%
Feminino	04	30,77%
Total	13	100%
Idade		
15 a 30 anos	05	38,46%
31 a 45 anos	03	23,08%
46 a 60 anos	05	38,46%
61 a 75 anos	00	00%
76 a 90 anos	00	00%
Total	13	100%
Estado Civil		
Solteiro (a)	09	69,23%
Casado (a)	04	30,77%
Separado (a)	00	00%
Viúvo (a)	00	00%
Total	13	100%

Fonte: o autor.

Durante a entrevista, percebeu-se também que as mulheres desenvolvem trabalho doméstico, o qual precisa ser conciliado com o trabalho na associação e outras atividades como o cuidado com as crianças (filhos ou netos) ou idosos. Muitas delas também não possuem companheiros e dependem quase exclusivamente da associação como fonte de renda, além de receberem auxílios, como o Bolsa Família.

Para Cherfem (2016) existe uma dicotomia entre as oportunidades de trabalho para homens e mulheres, onde o trabalho dos homens tem mais valor do que o das mulheres mesmo nas profissões que exigem menor qualificação para o trabalho. Esse fato é justificado pelo motivo do trabalho das mulheres representar um trabalho pouco qualificado e mal pago, sendo elas confinadas nos trabalhos manuais e que exigem baixa qualificação. A autora destaca ainda que devido ao comprometimento com as atividades domésticas, algumas mulheres possuem dificuldade para obter uma melhor qualificação profissional.

Quanto à caracterização por faixa etária, constatou-se que 05 (38,46%) catadores têm idade entre quinze e trinta anos; 03 (23,08%) têm idade entre trinta e um e quarenta e cinco anos;

05 (38,46%) têm idade entre quarenta e seis e sessenta anos; enquanto que não houve catadores com idade entre sessenta e um a setenta e cinco anos e setenta e seis e noventa anos.

A questão da empregabilidade do trabalhador acima dos 50 anos, nunca foi levado em consideração nos debates legislativos, muito menos o Estado brasileiro preocupou-se em levar o debate também para as empresas privadas, com medidas de incentivo à manutenção do emprego dos mais velhos, requalificação ou programas de preparação para a aposentadoria mais tardia (Félix, 2016).

Kirchner *et al.* (2009) relatam que no cenário moderno econômico do Brasil, a idade é um dos elementos que acometem predominantemente a forma de participação no mercado de trabalho formal, sendo que este é mais promissor na contratação de jovens. Contudo, este fato não ocorre na catação, pois não existem parâmetros de seleção para exercer esta atividade.

Como pode ser observado através da Tabela 1, onde o público entrevistado é bastante heterogêneo, a população de catadores é formada basicamente por adultos e jovens, embora com uma grande elasticidade na distribuição: variando entre quinze e sessenta anos, tendo maior índice de idade oscilando entre quinze a trinta anos e trinta e um a quarenta e cinco anos, faixa etária de sustentar a casa ou até mesmo da busca da independência financeira.

Quanto à caracterização por estado civil, 09 (69,23%) catadores são solteiros e 04 (30,77%) são casados. De acordo com a pesquisa foi observado que dos entrevistados que não moram sozinhos, o restante é responsável pela renda da família. Percebeu-se também que a faixa etária mais jovem, de 15 a 30 anos, também é a que apresenta a maior proporção de solteiros, e nas faixas mais velhas a quantidade de casados representa a maior parte.

Com relação ao nível de escolaridade, pode ser constatado na Tabela 2, que 10 (76,92%) catadores não completaram o ensino fundamental; 01 (7,69%) tem ensino médio incompleto; e 02 (15,39%) nunca estudaram. Observa-se que estes trabalhadores em sua maioria têm baixo nível de escolaridade, um dos motivos que pode levar as pessoas à exclusão do mercado formal de trabalho.

Tabela 2. *Caracterização quanto ao grau de instrução*

Grau de instrução	Quantidade	(%)
Ensino fundamental incompleto	10	76,92%
Ensino fundamental completo	00	00%
Ensino médio incompleto	01	7,69%
Ensino médio completo	00	00%
Superior incompleto	00	00%
Superior completo	00	00%
Nunca estudou	02	15,39%
Total	13	100%

Fonte: o autor.

Tal fato pode ser explicado pelo motivo de muitos dos catadores terem que abandonar seus estudos pela necessidade de se dedicarem mais tempo ao trabalho, devido à renda ser muito baixa e ou precisarem ajudar com as despesas da casa. Leal *et al.* (2002) relatam que para exercitar outras habilitações e profissões, os catadores necessitariam de cursos de qualificação profissional, oferecidos pelo Estado e da garantia de efetivarem-se em novas ocupações e habilitações.

Ainda de acordo com os autores supracitados, está-se diante de uma situação que manifesta os fundamentos da exclusão social, vista, pois, sob a ótica da desqualificação do trabalho, já que em termos profissionais os catadores envolvidos nos lixões não dispõem, em sua maioria, de instrução que os habilitem ao exercício das profissões de nível médio. Assim, a emergência do catador como agente econômico e ambiental se impõe ao processo de estigmatização social.

Em seus estudos Cherfem (2016) encontrou resultados semelhantes ao da pesquisa quando destaca que ao verificar a carreira de trabalho dos homens e das mulheres da cooperativa, percebeu-se que todos possuem baixa escolaridade por terem necessitado trabalhar desde muito novos, e grande parte estudou até a quarta série do ensino fundamental e outros nunca estudaram.

Ao analisar a caracterização socioeconômica dos catadores de materiais recicláveis descritos na Tabela 3, percebe-se que 12 (92,31%) auferem menos de um salário e 01 (7,69%) aufere um salário, não havendo, portanto, trabalhadores que auferissem mais de um salário. Embora não apresente altas taxas de variação, os rendimentos dos catadores estão superestimados, tendo em vista que um único

indivíduo declara possuir rendimentos mensais de 1 salário mínimo.

Tabela 3. *Caracterização socioeconômica dos catadores de materiais recicláveis*

Características socioeconômicas	Quantidade	(%)
Renda média mensal		
Menos de um salário	12	92,31%
Um salário	01	7,69%
Entre um e três salários	00	00%
Mais de três salários	00	00%
Total	13	100%
Dependentes da renda		
1 a 3 pessoas	07	53,85%
4 a 6 pessoas	05	38,46%
7 a 9 pessoas	01	7,69%
10 pessoas ou mais	00	00%
Total	13	100%

Fonte: o autor.

O Ministério do Meio Ambiente (MMA, 2019) relata que a participação de catadores na coleta seletiva de resíduo das cidades tem sido uma grande contribuição desses trabalhadores para o circuito da reciclagem e para a limpeza pública. É uma atividade econômica que integra outros aspectos importantes como a geração de renda, a proteção aos recursos naturais, a educação ambiental, a inclusão social e a prestação de serviços públicos.

Constatou-se que apesar dos catadores objetivarem a melhoria da qualidade de vida, e estes, serem adaptados à vida que levam chegando a trabalhar até 12 horas por dia, durante seis e às vezes até os sete dias da semana, a maioria aufere menos de um salário através da atividade que exercem. Em pesquisa semelhante realizada na ASCAMARC, Segundo *et al.* (2016) encontraram que 72% da amostra auferia menos de um salário mínimo com a atividade na associação e apenas 28% auferiam entre 01 e 02 salários mínimos com a catação de material reciclável.

Tal situação pode ser confirmada através das informações obtidas no período da aplicação da entrevista, onde foi encontrada uma variação de R$ 300,00 a R$ 998,00, embora a média mensal dos catadores tenha sido de R$ 350,00, e a maioria deles ganharem até R$ 300,00. Também em seus estudos Nascimento *et al.* (2017) constataram que das quatorze cooperativas estudadas no município de Goiânia a média salarial é de 1,3 salários mensais por trabalhador, tendo duas que apresentaram índices médios próximos a 2 salários e outras três sequer atingiram a margem de 1 salário por cooperado.

Ainda analisando a Tabela 3, percebeu-se que 07 (53,85%) catadores relataram que entre uma e três pessoas dependem da renda da atividade; 05 (38,46%) relataram que entre quatro e seis pessoas dependem da renda da atividade realizada e 01 (7,69%) catador relatou que entre sete e nove pessoas dependem da renda da atividade realizada e nenhum catador relatou que dez pessoas ou mais dependessem da renda da atividade realizada.

Por contar com um alto grau de materiais recicláveis, o resíduo reciclável proporciona capacidade de geração de postos de trabalho, embora seja uma atividade insalubre e de muito risco pela precariedade com que é realizada. E emprega trabalhadores que, no mercado formal, teriam pouquíssimas chances por sua falta de condições de empregabilidade (Ferreira *et al.* 2016).

A reciclagem vem se destacando como um importante elemento nas questões sócio/econômico e ambiental, pois a transformação dos resíduos produz novos produtos, preserva as fontes de recursos naturais, diminui a quantidade de materiais encaminhados para o aterro sanitário, gera emprego e renda para famílias de baixa renda, e propicia a integração entre cooperados, viabilizando a inserção no mercado de trabalho e de consumo das famílias envolvidas na atividade (Nascimento *et al.* 2017).

Observa-se, portanto, que a maioria dos catadores que realizam esta atividade sustenta sua família com uma renda pequena, ou seja, com menos de um salário mínimo, logo suas condições socioeconômicas são inferiores àqueles que possuem um menor número de dependentes da renda auferida pelos mesmos.

A Tabela 4 mostra que, apesar da maioria dos catadores classificarem a atividade como sendo boa e mesmo com todas as dificuldades existentes, esses trabalhadores estão caminhando e consequentemente esperam que surjam alternativas para melhores resultados, os mesmos acreditam que ainda necessitam de apoio, tanto político quanto econômico.

Tabela 4. *Classificação da atividade realizada*

Variável	Quantidade	(%)
Péssima	02	15,38%
Ruim	00	00%
Regular	00	00%
Boa	09	69,24%
Ótima	02	15,38%
Total	13	100%

Fonte: o autor.

Tal situação pode ser comprovada através das falas do Catador 01: “pra meiorá precisa de muita ajuda né? Ajuda do prefeito, ajudar os catador [...] com roupa pra trabaiá né? Bota, luva, essas coisas aí”; e Catador 02: “se nóis tivesse ajuda da prefeitura seria bem melhor porque assim a gente poderia ganhar luva e bota pra nu tá arriscando pegar uma doença qualquer e ter que deixar de trabalhar pra puder se cuidar da doença”.

Os catadores desempenham uma atividade que apresenta barreiras mínimas para a inserção de novos trabalhadores, é o desejo de autonomia e de controle sobre a tarefa que desempenham (trabalhar por conta própria e ausência de patrão) que explicaria o fato de alguns optarem por uma atividade que não exija vínculo.

Como corroboram os Catadores 03: “eu acho bom porque tô solto e não tem ninguém no meu mocotó, passei 25 ano naquela prefeitura com um caba no meu mocotó direto [...] e agora não tem ninguém pra me perturbar não”; e Catador 04: “é boa né? assim, porque ninguém fica pegando no pé do caba também né?”.

Frequentemente, os catadores exibem costumes e valores diversos dos recomendados como os essenciais em uma conjuntura de mercado de trabalho habitual, tais como assiduidade e competitividade. Desta forma, o trabalho fora de horários e rotinas determinados e a ausência de patrão representam uma flexibilidade que os trabalhadores habituais nem sempre dispõem (Carmo, 2009).

Nessa perspectiva, estes atores passam pelas vicissitudes do desemprego e submetem-se a variadas condições de precariedade do trabalho, por este motivo buscam esta atividade informal como solução verossímil para sua própria subsistência (Oliveira *et al.* 2011).

Quanto à atividade realizada antes de catar material reciclável, a Tabela 05 evidencia que algumas das atividades citadas pelos catadores não possuem regulamentação, ou ainda, não tem a devida atenção por parte do setor público, ajudando a compor o mercado informal de trabalho, que hoje possui parcela significante na economia brasileira – 36,3% segundo IBGE –, tendo o crescimento do desemprego como sendo um dos principais fatores responsáveis pelo aumento da informalidade (IBGE, 2019).

Tabela 5. *Caracterização quanto à atividade realizada antes de catar materiais recicláveis*

Variável	Quantidade	(%)
Enchedor de caçamba	01	9,09%
Agricultor	02	18,18%
Servente de Pedreiro	02	18,18%
Pavimentação de rua	01	9,09%
Garçom	01	9,09%
Vendedora	01	9,09%
Forro de casa	01	9,09%
Dona de casa	01	9,09%
Pedreira (produção de pó e brita)	01	9,09%
Total	11	100%

Fonte: o autor.

Os trabalhadores informais, representados pelos trabalhadores sem carteira assinada (empregados do setor privado e trabalhadores domésticos), sem CNPJ e sem contribuição para a Previdência Social (empregadores e por conta própria), apesar de obterem espaço no mercado de trabalho perpassam por uma série de dificuldades, pois além de não assegurarem o acesso aos direitos sociais e trabalhistas, muitos deles conseguem auferir uma renda muito baixa, exercendo atividades como as demonstradas na Tabela 5.

Para Oliveira *et al.* (2011) alguns elementos que são essenciais para fazer com que pessoas busquem no resíduo reciclável uma fonte de trabalho e sobrevivência, a saber: o desemprego de longa duração, a falta de qualificação e a complementação de renda. Portanto, essa fuga para uma subatividade daquelas existentes na cidade, revela não apenas o aumento do desemprego e os seus reflexos, mas também, que tal atividade passou a ocupar interstícios necessários para a indústria capitalista.

Conforme visto na Tabela 6, 08 (61,54%) catadores afirmaram que após a atividade de catação o nível de qualidade de vida aumentou e 05 (38,46%) afirmaram que o nível de qualidade de vida não aumentou após a atividade. Observa-se, portanto, durante a entrevista que um fator primordial para melhoria da qualidade de vida

desses sujeitos, é o fortalecimento na renda familiar, uma vez que supre as necessidades básicas do lar.

Tabela 6. *Caracterização quanto ao aumento no nível da qualidade de vida, a exercer outra atividade fora a de catação de materiais recicláveis e à contribuição da atividade para o meio ambiente*

	Quantidade	**(%)**
Aumento no nível da qualidade de vida após a atividade		
Sim	08	61,54%
Não	05	38,46%
Total	13	100%
Exerce outra atividade fora a de catação de materiais recicláveis		
Sim	05	38,46%
Não	08	61,54%
Total	13	100%
Contribuição da atividade para o meio ambiente		
Sim	13	100%
Não	00	00%
Total	13	100%

Fonte: o autor.

Embora 61,54% dos entrevistados tenham afirmado que a qualidade de vida aumentou após a atividade sob a justificativa de aumento da renda, alguns deles demonstravam certo ceticismo quanto a essa questão, como pode ser verificado através da fala do Catador 05: “o caba recebe o ganho, mas só da pra comer mesmo” e Catador 06: “a qualidade de vida aumentou, mas não tem outro meio de trabalho”.

É essencial que os locais que geram materiais recicláveis realizem a coleta seletiva dos diversos tipos de resíduos, visto que, ao chegar aos lixões e aterros sanitários, esse material possa ser naturalmente reconhecido pelos catadores (Silva e Nolêto, 2004). Logo, qualquer atividade que preconize dar uma melhor abordagem ao resíduo reciclável deve ter em vista, essencialmente, propiciar melhores condições de vida e de trabalho a estes catadores (Leal *et al.* 2002).

Com relação a exercer outra atividade fora a de catação de materiais recicláveis, 05 (38,46%) catadores disseram realizar outra atividade fora esta, tais como: faxineiro, agricultor, servente de pedreiro, vendedora de cosméticos e bijuterias e 08 (61,54%) não exercem outra atividade. (Miura, 2004) relata que parte dos trabalhadores da catação é oriunda da população desempregada, que atingidos por idade, condição social e baixa escolaridade, não encontram espaço no mercado formal de trabalho.

O motivo declarado pelos catadores que disseram exercer outra atividade fora a de catação de material reciclável é que o dinheiro que adquirem através da atividade é somente para atender as necessidades básicas, tais como: alimentar-se, beber e vestir-se, e exercendo outra atividade complementam sua renda e podem obter uma melhor qualidade de vida. Quanto aos que não exercem outra atividade o motivo declarado foi que com a renda auferida os mesmos conseguem ter uma vida tranquila e atender as necessidades de sobrevivência.

De acordo com a Tabela 6, constatou-se que 13 (100%) catadores acreditam que a atividade contribui para o meio ambiente, não havendo, portanto, trabalhadores que acreditassem que a atividade não contribuísse para o meio ambiente. Segundo Medeiros e Macêdo (2007) a contribuição dessa classe de trabalhadores é inquestionável sob o aspecto ambiental e, para, além disso, o fruto de seu trabalho é ponto de partida para o abastecimento, com matéria-prima, das indústrias de reciclagem.

Diante dos dados, observa-se que é cada vez mais frequente a preocupação com a questão ambiental e não é preciso ter um curso superior para se saber que o resíduo depositado ou jogado de maneira incorreta prejudica o meio ambiente. É devido à participação de tais profissionais, que a cada dia mais, materiais recicláveis estão sendo selecionados, com um destino ambientalmente correto, economicamente viável e socialmente justo.

Existe uma consciência bastante generalizada entre os catadores, de que o trabalho por eles realizado é importante para a cidade, como relata o Catador 07: “se fosse levar em conta esse trabalho nosso, deveria ser bem melhor remunerado. A gente contribui com o meio ambiente; onde a gente passa, a rua fica limpa”; Catador 08: “se não fosse essa atividade o meio ambiente estava perdido” e Catador 09: “catar material recicrável ajuda 100% ao meio ambiente, porque tamo tirando a maior parte dos material pra não ir pro meio ambiente né?”.

Mecanismo de sustento, alternativa para alcançar a independência, maneira de se sentir útil – essas e outras tantas foram as respostas dadas pelos entrevistados ao serem perguntados sobre o porquê de trabalhar com a atividade de catação de materiais recicláveis. Alguns catadores começaram a trabalhar ainda quando criança, exercendo atividades auxiliares às desenvolvidas por seus pais. Com o tempo,

passaram por várias ocupações tais como, enchedor de caçamba, servente de pedreiro, dona de casa, vendedora, garçom, agricultor, entre outras.

Os catadores foram abandonando uma quantidade significativa de profissões para ingressarem no trabalho com o material reciclável. O desemprego foi o motivo mais marcante para a busca de uma ocupação na atividade de catação. Entretanto, a necessidade de ajudar em casa (precisão), complementando a renda dos familiares, foi um motivo que mereceu destaque entre aqueles que começaram a trabalhar ainda crianças.

Foi possível observar *in loco* que os catadores estão expostos as mais precárias condições de trabalho, pois não fazem o uso de Equipamentos de Proteção Individual (EPIs), isto é, não utilizam proteção, como: luvas, botas, máscaras e etc. eles afirmaram não usarem porque ganham pouco, e se ainda fossem retirar algum valor para compra desses equipamentos diminuiria a quantidade de coisas que poderiam comprar para seu sustento. Por outro lado, eles garantem que se tivessem apoio de alguns órgãos públicos que doassem os mesmos utilizariam os EPIs. Como relata o Catador 07: “seria bom se nós ganhasse bota e luva pra poder catar o lixo e sem correr riscos de se cortar ou pegar uma doença”.

Quando perguntados sobre o que seria necessário para que houvesse uma melhoria na qualidade da atividade realizada pelos catadores, a resposta declarada pela maioria 05 (38,46%) foi que os moradores fizessem a coleta seletiva e 04 (30,77%) dos entrevistados foi a de que houvesse doação de fardas e EPIs, pois muitas vezes pegam em coisas que furam os pés e mãos, assim como muita sujeira que não é reciclável, 01 (7,69%) aumentasse o ganho por meio do valor das mercadorias, 02 (15,39%) que a prefeitura concedesse mais atenção para eles e 01 (7,69%) que seria necessária a reforma do prédio da associação, pois as ripas estão se acabando, o teto está cheio de goteiras e pode ocasionar algum risco de acidente e perda do material coletado.

Realizando a coleta seletiva, a qualidade dos materiais recicláveis se mantém, uma vez que não serão contaminados pelos resíduos orgânicos, facilitando também o trabalho dos catadores, aumentando consideravelmente a quantidade de material coletado e preservando a saúde, pois eles não precisarão revirar cada saco de resíduo à procura de algum material aproveitável. Quanto à infraestrutura da Associação os associados relataram que a prefeitura já doou um terreno na zona sul do município para a construção do galpão, contudo eles dizem que o local é muito distante do lixão e dificultaria o trabalho por eles desenvolvido.

Em seus estudos Nascimento *et al.* (2017) destacam que a falta de estrutura, como por exemplo, a cobertura adequada, resulta em dano aos catadores, posto que o material ao ser contaminado necessita ser escolhido e enviado ao aterro sanitário, o que demanda muitas horas de trabalho dos cooperados, tornando-se inútil do ponto de vista econômico, tendo em vista que os ganhos financeiros são medidos pela quantidade de material selecionado e em condições de venda.

Também foi questionado o motivo pelo qual os fizeram tornar catadores de materiais recicláveis, 04 (30,77%) disseram que era porque estavam desempregados; 03 (23,08%) responderam que passaram a catar por precisão; 03 (23,08%) porque gostam da atividade; 01 (7,69%) porque trabalha a hora que quer e faz o que quer, ou seja, é seu patrão; 01 (7,69%) porque pegou experiência com o pai; e 01 (7,69%) relatou que começou a exercer a atividade porque achava bonito os outros catando.

Para Martins *et al.* (2016) a inexistência de oportunidades de inserção no sistema econômico conduz os catadores à marginalização. O perfil demonstrado é o de desemprego, da falta de escolaridade e a precisão de complementação da renda familiar. Estes trabalhadores procuram na coleta de materiais recicláveis uma fonte de renda a qual seja possível de manter suas famílias. Segundo Medeiros e Macêdo (2007) o trabalho ocupa um lugar central na vida de quem o realiza, sendo ele um meio de subsistência e de integração social, pois possibilita o relacionamento entre pessoas, a inclusão social e o sentimento de pertencer a um grupo.

Logo, o trabalho exercido pelos catadores de materiais recicláveis representa uma reflexão multidisciplinar que ultrapassa o registro das variáveis econômicas, sociais e ambientais. Assim, a opção por tais aspectos possibilitou a percepção de um modo peculiar de sobrevivência que reproduz e se adapta em um ambiente hostil, por outro lado, tal forma de estratégia de sobrevivência se processa em um movimento mais geral, isto é, de um conjunto de forças que coexistem na sociedade contemporânea, resultado da exclusão social de uma boa parcela da população.

4. CONCLUSÕES:

Devido à questão do resíduo reciclável ser cada vez mais agravante, estão sendo pensadas e discutidas novas maneiras de reaproveitamento e disposição final do material descartado, sendo a reciclagem um importante instrumento para conciliar crescimento econômico e conservação ambiental com desenvolvimento sustentável, através da catação dos materiais recicláveis evita-se que estes poluam o meio ambiente e ainda criam alternativas de geração de emprego e renda para pessoas que estão fora do mercado de trabalho formal.

Com base nos levantamentos realizados pelas entrevistas e pela visita *in loco*, identificou-se que os catadores auferem menos de um salário através da atividade que exercem. Com relação à renda, a questão é saber como ela distribui-se entre as pessoas que sobrevivem dela e se as razões de seu crescimento se devem ao aumento das horas trabalhadas ou à maior produtividade, o simples aumento da renda não indica necessariamente se esses trabalhadores se encontram melhor ou pior em termos de saúde, educação e conforto, isto é, na qualidade de vida; uma possível melhoria no nível de bem-estar das pessoas é apenas inferida pela elevação da renda *per capita*.

A maior parte dos catadores entrevistados revelou que o desemprego e a precisão foram os principais motivos que os levaram a trabalhar com reciclagem. Entretanto, cabe considerar que, com o passar do tempo, existe uma identificação com o trabalho por parte de alguns associados, o que os faz manterem-se no trabalho.

Pode-se notar que a maioria dos catadores afirmou que após o início na atividade de catação de material reciclável houve melhoria no nível de qualidade de vida, essa noção implica em uma mudança de estruturas econômicas, sociais, políticas e institucionais, com melhoria da renda média dos agentes envolvidos.

Quanto à atividade contribuir para o meio ambiente percebeu-se que atualmente há uma grande preocupação com os danos gerados ao meio ambiente por resíduos recicláveis que apresentam tempo de degradação longo. Logo são necessárias mudanças drásticas na forma de produção e consumo dos materiais comercializados para que o ambiente seja tratado de maneira mais correta.

Constatou-se, pois que pela forma que realizam a atividade e pela falta de estrutura os catadores de materiais recicláveis podem ser considerados trabalhadores precarizados. No entanto, atualmente a situação destes trabalhadores encontra-se um pouco distinta de antigamente uma vez que os catadores são reconhecidos como categoria pela Classificação Brasileira de Ocupações (CBO) e também foi criado um Plano Nacional de Resíduos Sólidos como incentivo a estes trabalhadores com o objetivo de aumentar a renda das pessoas que sobrevivem desta atividade.

Portanto, conclui-se a partir dos resultados obtidos a importância social, econômica e ambiental do trabalho dos catadores de materiais recicláveis, apesar das condições precárias em que realizam a atividade, sem a participação destes na base da cadeia da reciclagem talvez a situação ambiental se encontrasse mais caótica nos últimos tempos.

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RESEARCH PAPER

DESAFIOS ÉTICOS NOS PROCEDIMENTOS DA CESÁRIANA COM INDICAÇÃO DE pelve contraída EM PACIENTES CONFIRMADOS COM COVID-19

ETHICAL CHALLENGES IN CESARIAN SECTION PROCEDURES TO INDICATION OF CONTRACTED PELVIS IN COVID-19 CONFIRMED PATIENTS

TANTANGAN ETIKA PADA PROSEDUR SEKSIO CESARIA ATAS INDIKASI KONTRAKSI PANGGUL PADA PASIEN TERKONFIRMASI COVID-19

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RESUMO

A pandemia COVID-19 apresentou vários desafios éticos para todo o pessoal médico. Todo médico sempre presta o melhor atendimento aos pacientes e segue o protocolo de saúde COVID-19 no atendimento aos pacientes. Questões éticas surgem quando os médicos se deparam com um dilema no tratamento de pacientes COVID-19 relacionado aos recursos humanos, instalações e infraestrutura limitadas no tratamento de pacientes no hospital regional, portanto, o paciente deve ser encaminhado. Relatamos um caso de obstetrícia: uma paciente de 24 anos apresentou a primeira gravidez, idade gestacional de 39-40 semanas com queixas de azia e manchas no canal de parto. A paciente foi encaminhada para um hospital regional, cuja cesariana eletiva estava planejada por indicar uma pelve contraída. No entanto, verificou-se que os resultados do teste de rastreamento rápido foram reativos ao COVID-19 e positivos no exame de RT-PCR. O procedimento médico realizado foi a interrupção imediata da gravidez por meio de cesariana, que exige preparo mental da paciente, da família e de equipe médica. A formação de uma equipe multidisciplinar de médicos, a preparação de instrumentos e locais para os cuidados pós-operatórios de mães e bebês, fornecer informações a pacientes e familiares, consentimento informado, necessidades especiais de mães e bebês é um desafio ético que precisa ser abordado com cautela. O desafio ético nos casos de interrupção da gravidez em pacientes com COVID-19 é o seu apelo, que deve encontrar uma solução a partir da teoria da ética clínica e do princípio básico da ética médica.

Palavras-chave: *Cesariana, pelve contraída, COVID-19, desafios éticos*

ABSTRACT

The COVID-19 pandemic has posed several ethical challenges for all medical personnel. Every doctor always provides the best service to patients and follows the COVID-19 health protocol in handling patients. Ethical issues arise when doctors are faced with a dilemma in handling COVID-19 patients related to human resources, limited facilities, and infrastructure in handling patients in the regional hospital, so the patient must be referred. It was reported an obstetrics case: a 24-year-old patient presented with the first pregnancy, gestational age 39-40 weeks with heartburn complaints, and spotting from the birth canal. The patient was a referral from a regional hospital whose elective cesarean section was planned due to the diagnosis of a contracted pelvis. However, it turns out that the rapid screening test results were reactive to COVID-19 and positive in RT-PCR examination. The medical procedure taken was the immediate termination of pregnancy by a cesarean section

that required mental preparation of the patient, family, and a team of doctors. The formation of a multidisciplinary team of doctors, the preparation of tools and places for postoperative care for mothers and babies, provide information to patients and families, informed consent, special needs of mothers and babies is an ethical challenge that needs to be addressed carefully. In cases of pregnancy termination in COVID-19 patients, the ethical challenge is its appeal, which should find a solution using clinical ethics theory and the basic principle of medical ethics.

Keywords: *Caesarean section, contracted pelvis, COVID-19, ethical challenges.*

ABSTRACT

Pandemi COVID-19 telah menimbulkan sejumlah tantangan etika bagi semua tenaga medis. Setiap dokter selalu memberikan pelayanan terbaik kepada pasiennya namun juga harus mengikuti protokol kesehatan COVID-19 dalam menangani pasien. Masalah etika muncul ketika dokter dihadapkan pada dilema dalam penanganan pasien COVID-19 terkait sumber daya manusia dan keterbatasan sarana dan prasarana penanganan pasien di rumah sakit daerah, sehingga pasien harus dirujuk. Kami melaporkan sebuah kasus obstetrik: pasien berusia 24 tahun, datang dengan keluhan hamil yang pertama, usia kehamilan 39-40 minggu dengan keluhan mulas, dan bercak dari jalan lahir. Pasien adalah pasien rujukan dari rumah sakit daerah yang direncanakan akan dilakukan operasi caesar elektif untuk indikasi adanya kontraksi panggul, namun ternyata hasil rapid screening test reaktif terhadap COVID-19 dan pada pemeriksaan RT-PCR hasilnya positif. Tindakan medis yang dilakukan adalah penghentian segera kehamilan dengan operasi caesar yang membutuhkan kesiapan mental dari pasien dan keluarga, serta tim dokter. Pembentukan tim dokter multidisiplin, penyiapan alat dan tempat perawatan pasca operasi ibu dan bayi, memberikan informasi kepada pasien dan keluarga, informed consent, kebutuhan khusus ibu dan bayi merupakan tantangan etis yang perlu ditangani dengan hati-hati. Tantangan etika dalam kasus terminasi kehamilan pada pasien COVID-19 memiliki daya tarik tersendiri, dan harus dapat dicari solusinya dengan menggunakan teori etika klinis dan prinsip dasar etika kedokteran.

Kata kunci: *Operasi caesar, kontraksi panggul, COVID-19, tantangan etika.*

1. INTRODUCTION:

The world is experiencing a pandemic that has killed many people quickly and changed all orders from all aspects, namely the novel coronavirus. This virus, a new type of coronavirus, was first identified in Wuhan, Hubei Province, China, at the end of December 2019 (Calda *et al*., 2020). Initially, China reported a mysterious pneumonia case of unknown cause. The isolated sample from the patient was then studied and showed the results of the coronavirus infection, a new type of beta-coronavirus because it was discovered in 2019, named 2019 novel Coronavirus (2019-n-CoV-2) (Wu *et al.*, 2020). On February 11, 2020, the World Health Organization (WHO) provided the name of the new virus is Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and the name of the disease as Coronavirus disease 2019 (COVID-19) (Wang *et al*., 2020; World Health Organization, 2020).

Viral transmission is known from animals to humans and from humans to humans through contact transmission, droplet transmission, fecal and oral routes, or contaminated surfaces (Wu *et al*., 2020). Pregnant women are particularly susceptible to respiratory pathogens and severe pneumonia due to physiological changes in the immune immunity and cardiopulmonary systems (for example, the elevation of the diaphragm, increased oxygen consumption, and edema of the respiratory tract mucosa), which can make them intolerant of hypoxia (United Nations, 2020; Yan *et al*., 2020).

COVID-19 infection can cause mild, moderate, or severe symptoms. The main clinical symptoms are fever (temperature > 38 ^{o}C), cough, and difficulty breathing. It can also be accompanied by severe shortness of breath, fatigue, myalgia, and gastrointestinal symptoms such as diarrhea and other respiratory symptoms. Half of the patients developed shortness of breath within one week. In severe cases, deterioration rapidly and progressively, such as acute respiratory distress syndrome (ARDS), septic shock, intractable metabolic acidosis, and bleeding or dysfunction of the coagulation system within days. In some patients, the symptoms appear mild, even without fever. Most patients have a good prognosis, with a minority in critical condition, even dying (Hantoushzadeh *et al.*, 2020; Li *et al*., 2020).

The spike in COVID-19 cases has overwhelmed health systems worldwide, including Indonesia. Indonesia declared the COVID-19 disease a national disaster on March 14, 2020. It was determined through Presidential

Decree number 12 of 2020 on April 13, 2020, concerning the Determination of non-natural disasters for the spread of Coronavirus disease 2019 (COVID-19). COVID-19 cases in Indonesia have continued to increase in recent months, including in the province of Aceh. There are 13 hospitals in Aceh that have been designated as referral hospitals for COVID-19 patients, but most of them do not have adequate facilities and infrastructure and limited human resources. So that in cases of COVID-19 patients who require a specific medical procedure, the patient was referred to Dr. Zainoel Abidin Regional Public Hospital (ZARPH) as the main referral hospital for Aceh province.

2. MATERIALS AND METHODS:

The method of this study was a case report. This case report discusses a 24-years-old woman 39-40 weeks pregnant with a contracted pelvis. The patient was a referral from a regional hospital, and a cesarean section was planned. Before being referred from a regional district hospital, the screening for COVID-19 was carried out first, and reactive results were obtained. Due to the limited availability of experts and surgery facilities on patients with COVID-19 infection, the patient was referred to the ZARPH in Banda Aceh. At the ZARPH in Banda Aceh, the patient was re-examined, physical examination, supporting examinations, and a reverse-transcription polymerase chain reaction (RT-PCR) test positive result of COVID-19 infection. Then by preparing and using the COVID-19 protocol and involving the handling of a related multidisciplinary team including obstetricians, pulmonologist, internist, anesthetists, bioethicist, medicolegal expert, midwives, neonatologists, neonatal nurses, psychiatrist, and psychologists, the patient was decided to terminate the pregnancy with a Caesarean section procedure, was born a baby boy, with a baby weight of 3300 grams. Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) score 8/9, after which the baby was treated separately from the mother.

The handling of the COVID-19 pandemic has raised medical ethics issues that are of concern to all medical personnel (Montazeri, 2020). In this case report, we would like to discuss several ethical challenges related to the performance system for medical personnel, including how to provide information to patients and families, informed consent, special needs of mothers and babies, how to involve all aspects of the COVID-19 pandemic, and how to reduce the psychological impact of medical personnel and patients (McGuire *et al*., 2020; Munawar, 2019).

The ethical challenge in cases of pregnancy termination in COVID-19 patients has its appeal, which should find a solution using a combination between clinical ethics theory and the basic principle of medical ethics (Beauchamp and Childress, 2013; Jonsen *et al*., 2010). The Federation International of Gynaecology and Obstetrics (FIGO) also explained the use of clinical ethics that makes it easier to face these ethical challenges (Suryadi *et al*., 2020). In clinical ethics, it is always discussed the balance between medical indications, patient preferences, quality of life, and contextual features (Jonsen *et al*., 2010).

3. RESULTS AND DISCUSSION:

3.1. Ethical challenges for medical personnel

Currently, the most significant ethical challenge in health services is how to break the chain of transmission by focusing on medical devices such as Personal Protective Equipment (PPE), masks, and hand sanitizers, which make health services more personal, even during a pandemic, quarantine, and physical distancing are needed (Xafis *et al.*, 2020). As the pandemic develops, placing health care providers is under more significant pressure because health care providers must remain professional. However, on the other hand, there are fewer personal health service providers due to restrictions on activities in a society, which will cause ethical problems. (British Medical Association, 2020; United Nations, 2020).

3.1.1. Reduce the psychological impact of medical personnel

Ethical challenges also occur for medical personnel in dealing with COVID-19 patients. Doctors must uphold the four basic principles of ethics in their practice: beneficence, non-maleficence, Justice, and autonomy (Beauchamp and Childress, 2013). Physicians must always balance the obligation to protect patients from morbidity (beneficence-non-maleficence) and respect for patients' reproductive rights and decisions (respect for autonomy). Using the principle of Justice, namely that there should be no differences and considerations other than the patient's health, is the doctor's primary concern.

However, still adhere to the COVID-19 health protocol.

When treating patients with complications of COVID-19, doctors must be careful and professional. In carrying out their duties, doctors always prioritize the interests of patients compared to their interests, which can be seen in the altruistic attitude of doctors. Doctors are aware that dealing with COVID-19 patients is also at risk of exposure, but doctors are also aware that patients need their profession. To reduce the psychological burden of doctors when dealing with COVID-19 patients, there are several experiences of doctors who take part in treating these patients, including doctors supporting each other to calm their colleagues who have just treated patients. The advice given by doctors to colleagues is always to use PPE while on duty, washing hands after taking medical procedure, take a multivitamin to maintain body immunity, and get adequate rest. The most important thing is that doctors must be open and honest. If they are not in mental and physical fitness, they should not take part in treating patients. One of the other professional attitudes of doctors is that doctors must take care of their health not to endanger themselves and their patients.

3.1.2. Provide information to patients and families

Making medical decisions in this case, not only immediately looks at the medical aspects but also includes aspects of clinical ethics how to explain information to patients and families for informed consent, a particular need for pregnant women with COVID-19 and newborns, how to involve multidisciplinary teams in decision-making, and how to reduce concerns of discrimination and the effects of mental health on medical personnel and patients in particular (McGuire *et al*., 2020; Organización Mundial de la Salud, 2020; Suryadi and Kulsum, 2020; Wu *et al.*, 2020).

Pregnancy with COVID-19 is a case that has not been published much, so the lack of public knowledge about COVID-19, which considers COVID-19 is an embarrassing/ disgraceful thing. Therefore there is a need for multidisciplinary knowledge that must work together both in terms of communication with patients and families by adhering to the ethical and humanities order, a psychological approach to getting consent for actions that the patient and family understand. Publication in social media and electronic media is also beneficial (British Medical Association, 2020).

3.1.3. Informed consent

Informed consent is a method for sharing information between the doctor and the patient. It must be occurred collaboratively (cooperation) between doctors and patients and their families to obtain the best option for the patient's treatment (Afandi, 2018). In this case, it is not easy to provide the patients and their families to understand obstetric problems treatment, especially for a couple with COVID-19. In a complicated situation like this, the patient and their families do not have a long time understanding the contents of the information because the medical procedure must be taken immediately. Moreover, it is added if the patient and their families cannot consent, so a surrogate decision-maker is needed (McGuire *et al*., 2020). Patients and their families may not understand information about postoperative care. For example, why patients should be treated separately from their babies, how patients give breastmilk for the baby, how long patients have to be treated, and why it has to wait for 10+3 days in isolation.

The information must also be conveyed if the patient's condition gets worst after surgery, along with the underlying disease of COVID-19. The doctor must explain the procedures of patients' COVID-19, such as respiratory failure. They must be treated in the Respiratory Intensive Care Unit (RICU), use of a ventilator, or Cardiopulmonary resuscitation (CPR) procedure (McGuire *et al*., 2020). The ethical aspects of informed consent focus on autonomy, trust, self-determination, personal integrity, and non-dominance (Shaha *et al.*, 2013). The doctor should provide information that uses language that is easy to understand by patients and their families. When doctors provide information, doctors must also pay attention to the socio-cultural and emotional aspects of patients and their families. The essential thing in an informed consent procedure is respect for the patient's autonomy rights (Aldossari *et al*., 2017).

3.2. Solution by using clinical ethics theory

Ethically, the basic values adopted by doctors are to seek a balance of benefit-risk by prioritizing greater clinical benefits for clinical harm to patients as a consequence of doctor's management (Suryadi *et al*., 2020). According to the theory of clinical ethics, four quadrants can be

considered: medical indications, patient requests, quality of life, and contextual features. This theory is often called the four-box method (Jonsen *et al*., 2010).

3.2.1. Medical indication

Determination of medical indications in patients with a contracted pelvis diagnosis accompanied by confirmed COVID-19 can be done using the ethical principles of beneficence and non-maleficence. The principle of beneficence means that therapy must provide medical benefits, while non-maleficence means not to harm the patient both medically and financially (Beauchamp and Childress, 2013; Jonsen *et al*., 2010).

The patient was referred to ZARPH because the regional district hospital was still lacking human resources and facility for handling pregnant patients with COVID-19, where there will be many preparations, both in terms of multidisciplinary professional doctors to treat patients, RT-PCR examinations, unique COVID-19 rooms, and PPE, as well as post-delivery care rooms for patients and her baby.

Medical Indications, divided into 2, which are from the maternal and baby. In this case, the indication for termination of the patient was Caesarean section, in which the mother had a contracted pelvis, and was done immediately because there were already signs of delivery (British Medical Association, 2020). The contracted pelvis is an absolute indication for the Caesarean section (Cunningham *et al.,* 2018).

Obstetric indications can be handled at the regional district hospital, but because the patient is suspected of being infected with COVID-19, the patient is referred for comprehensive treatment. The reason patients were referred to ZARPH was due to limited facilities ranging from the absence of standard operating rooms for patients confirmed with COVID-19. These postoperative rooms were also not available for handling patients infected with COVID-19. The medical indication for baby, a particular room must be prepared for baby care, especially if an intensive neonatal room was needed.

Until now, there is no robust clinical evidence to recommend one way of delivery for pregnant women infected with COVID-19, so delivery is based on obstetric indications by paying attention to the wishes of the mother and family, except for mothers with respiratory problems that require immediate delivery in the form of a Caesarean section or per-vaginal surgery (Calda *et al.*, 2020; Li *et al*., 2020; Royal College of Obstetricians and Gynecologist, 2020; Yan *et al.*, 2020).

3.2.2. Patient preference

The patient preference or their families are served using the autonomy principle. Autonomy means that every medical procedure must have the consent of a competent patient (or her immediate family, if the patient is unable to give her consent) (Beauchamp and Childress, 2013; Jonsen *et al*., 2010).

The patient preference from the pregnant women with COVID-19, there are ethical challenges, where the mother must be strong and sincere because in the delivery process, and giving birth cannot be accompanied by someone she loves, the family must also be encouraged to keep a distance from the patient. Patients cannot touch the baby who is born, and breastfeeding cannot be done directly. This is where the role of medical personnel, psychologists, and psychiatrists, especially in strengthening the mentality of patients, and their families, in understanding the conditions they are experiencing (McGuire *et al*., 2020).

It is well known that the transmission of viruses from animals to humans and humans to humans through contact transmission, droplet transmission, faecal and oral routes, or contaminated surfaces (Breslin *et al*., 2020; Kuhrt *et al*., 2020; Patane *et al*., 2020). Although there have been several reports where infants tested positive for the presence of the virus sometime after birth, this study needs further validation of this transmission, whether intrauterine or the postnatal period (Berghella *et al*., 2020; Di Mascio *et al*., 2020).

It is also unclear at this point whether COVID-19 infection can cross the trans-placental route to the baby. Pregnant women are particularly susceptible to respiratory pathogens and severe pneumonia, due to physiological changes in the immune immunity and cardiopulmonary system, for example, elevation of the diaphragm, increased oxygen consumption, and edema of the respiratory tract mucosa, which may make them intolerant of hypoxia (United Nations, 2020; Yan *et al*., 2020).

For babies, the treatment is similar to cases of a cesarean section without COVID-19.

Initially, it was carried out as rooming-in. However, because the mother was not sure that she could maintain health protocols such as touching her baby often without washing her hands first due to difficulty mobilizing due to postoperative pain, there was a risk of transmitting the disease. However, recommendations from the Royal College of Obstetricians and Gynecologists and the Indonesian Association of Obstetrics and Gynecology allow direct breastfeeding as long as the mother can maintain health protocols related to COVID-19 (Indonesian Association of Obstetrics and Gynecology, 2020; Royal College of Obstetricians and Gynecologist, 2020).

Based on the research, breastmilk was harmful to COVID-19, but close touch with the baby can transmit and infected airborne droplets (Royal College of Obstetricians and Gynecologist 2020). Therefore, a doctor should discuss the risks and benefits of breastfeeding with the mother and families, especially about the virus COVID-19 transmit to the baby. In this case, the patient is not directly breastfeeding and does not join the mother. In this case, the baby has been tested for RT-PCR and got a negative result. Therefore, in this case, it is proved that there is no evidence of transmission of COVID-19 through the placenta.

3.2.3. Quality of life

Measurement of quality of life is determined using the principles of beneficence, non-maleficence, and autonomy. Quality of life is a form of satisfaction, statement of value, life experience in all aspects for the better or worse (Jonsen *et al*., 2010).

Quality of life in pregnant patients with COVID-19 without symptoms can carry out self-isolation, up to 14 days after being diagnosed with COVID-19, then re-examination until the results are negative. Maintain health, exercise, nutritious and healthy food, multivitamins, and ensure good air circulation in the room and other COVID-19 protocols. In babies, in this case, it is done the same as healthy babies in general.

After being treated for three days after surgery at the hospital, because this patient was asymptomatic of COVID-19, the patient went home for outpatient treatment and was educated to return to control after 14 days for repeated RT-PCR examination. The repeated RT-PCR results were negative for COVID-19.

3.2.4. Contextual features

Contextual features are obtained using the principles of Justice and fairness. Although clinical ethics focuses more on medical indications, patient preference, and quality of life, medical decisions are not only made by doctors and patients. However, they must also consider other aspects such as socio-cultural, belief, religion, and financial (Jonsen *et al*., 2010).

In this case, the contextual features are when the patient returns to her residence; the patient is not accepted in her social environment because the community still thinks that the patient can still transmit the disease. This is an ethical challenge in itself related to discrimination and stigmatization for patients with confirmed COVID-19. Health workers must provide education to patients, families, and the community to maintain health protocols in the form of wearing masks, washing hands, and social distance to reduce the risk of contracting COVID-19. Furthermore, until this article was written, the patient had been declared cured, and the baby was also healthy.

3.3. Solution by using principles base on ethics

Ethical concepts should guide obstetricians to reach clinical judgments that are ethically justified (Suryadi *et al*., 2020). According to the base of the principle of ethics, four main principles can be considered in resolving ethical challenges in a clinical situation, namely beneficence, non-maleficence, Justice, and autonomy (Beauchamp and Childress, 2013; Gillon, 2015).

3.3.1. beneficence

The beneficence principle aims to provide maximum benefit for the patient and balancing benefits and risks (Afandi, 2017). In this case, the patient was referred to ZARPH due to a lack of facilities and insufficient availability of doctors. The purpose of the referral is to provide benefits for patients because the disease suffered by patients can be treated immediately with better facilities and reduce the risk of spreading COVID-19 infection.

The principle of beneficence is the golden rule, where every medical practice must be altruistic, full of kindness, compassion, respect for human dignity, and treat patients as they should commonly (Mappaware *et al*., 2020).

The principle of beneficence can be carried out together with non-maleficence because a medical procedure aims to maximize benefits (the principle of maximum bonus) and minimize harm (the principle of minus malum) (Suryadi *et al*., 2020).

3.3.2. Non-maleficence

The principle of non-maleficence is that any medical service must not harm the patient. In providing therapy, doctors must not have medical procedures that injure patients, for example, invasive measures such as cesarean section. In this case, the patient underwent a cesarean section not to injure the patient by cutting the stomach and opening the uterus. However, the purpose of this procedure was to take the fetus, which had to be done because the patient had a contracted pelvis that did not allow vaginal birth. This principle is called the double effect principle, in which good goals must be passed in a bad way (injuring) because it is the only way that must be done (Wholihan and Olson, 2017). So it can be stated that the double effect principle supports the principle of non-maleficence in ethical decision-making in dilemma cases (Suryadi *et al*., 2020).

3.3.3. Justice

Equality is the essence of Justice, but Aristoteles argues that Justice is more than equality. Someone can feel that they are not treated properly even though they have been treated the same (Afandi, 2017). In this case, the patient received unfair treatment because of discrimination and stigmatization from the surrounding community. The solution to the ethical challenge here is to explain to the public that COVID-19 can affect anyone, and this disease is not a disgrace that society should stigmatize. In a COVID-19 pandemic like this, people should work hand in hand to reduce transmission risk by limiting activities outside the home, physical distance, wearing masks, and always washing hands with soap. Several efforts to control the spread of COVID-19 were carried out with social distancing and large-scale social restrictions, lockdowns, and travel restrictions (Xafis *et al.*, 2020).

Using the principle of Justice, the public will understand that discriminatory action against patients confirmed with COVID-19 will harm themselves because they may become the next patient. So the principle of Justice here is to treat others as they want to be treated.

3.3.4. autonomy

Autonomy rights are rights to self-determination. In this case, the patient wants to care for the baby directly as usual in postnatal care. In ordinary conditions, this must be respected as a form of giving the highest possible autonomy rights. However, in cases like this, for the benefit of the patient, the patient's autonomy rights are limited, considering the risk of contracting COVID-19 to the baby. In a case like this applies the prima facie principle, which puts forward the higher and dominant interests. So the prima facie is that autonomy changes to non-maleficence or beneficence (Purwadianto, 2007).

Respect for autonomy is something that is only required if it does not contradict the other main principles of bioethics; for example: if an act of autonomy will harm himself or other humans, then the principle of respect for autonomy will contradict the principle of non-maleficence, then the principle must be decided (Afandi, 2017).

4. CONCLUSIONS:

This article concluded that the management of pregnant patients with contracted pelvis complications accompanied by COVID-19 infection poses quite complex ethical challenges. In this case, the problem is not only a medical problem but also related to the handling of COVID-19 suffered by patients. Ethical issues arise due to the lack of facilities and human resources in rural hospitals. After being referred to a provincial hospital, other ethical issues are the psychology of families affected by COVID-19, a surgery that requires special PPE, and postoperative separation of mothers and babies. In terms of medical personnel, the psychological aspects of medical personnel also need to be prepared because, on the one hand, medical personnel is also worried about contracting the COVID-19 infection. However, on the other hand, they must continue to carry out their duties professionally.

The responsibility of patients, families, and communities is also very helpful in breaking the chain of transmission of the COVID-19. It needs continuous education from health authorities to plan the COVID-19 pandemic towards a new normal life. Here the community is

required to continue to cultivate efforts to prevent COVID-19 infection through activities of wearing masks, washing hands, and physical distancing because this COVID-19 pandemic may continue for some time to come.

5. ETHICAL STATEMENT

This is a retrospective case report without the use of any samples from a human subject, so ethical approval can be waived. Consent to participate has been obtained from the relative was written.

6. COMPETING INTEREST

The authors declare that there are no competing interests related to the study

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