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Chronic Respiratory and Other Major Chronic Diseases Prevention in the WHO Western Pacific Region During the COVID-19 Epidemic

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ABSTRACT: The Western Pacific Region (WPRO) made the biggest success in the prevention and control of chronic respiratory diseases (CRD) before the outburst of the COVID-19 epidemic. This encouraging situation did not worsen substantially during the epidemic. NCD management indicators in middle-income countries (MIC) remained better accomplished in WPRO same concerned tobacco control. Visible deterioration of public education campaigns on physical activity during the epidemic has happened globally and especially in WPRO. In view of this, it's critical to reestablish these activities to maintain achievements reached in the region before the COVID-19 epidemic. Population of the less-resourced settings continue to have lack of access to different services and technologies linked with the prevention of NCD. This disparity restrains a comprehensive reaction to the world crisis.

Keywords: World Health Organization (WHO); COVID-19; Chronic respiratory diseases (CRD); WHO Western Pacific Region (WPRO); Prevention of noncommunicable diseases (NCD)

1. Introduction

Improved prevention, diagnosis, and management of noncommunicable diseases (NCD) have contributed to an important decline of mortality from these diseases since 2000, and in particular from chronic respiratory diseases (CRD) and cardiovascular diseases (CVD). It was first reported in 2017 during the meeting of the WHO Independent High-level Commission on NCD [1]. This lowering of mortality further continued, and according to WHO probability of death from major NCD decreased from 22.9% in 2000 to 17.8% in 2019 [2]. The greatest decrease globally (around 30%) occurred in high- and upper-middle income countries and regionally in the European (EURO) and Western Pacific (WPRO) regions, 31% and 27%, accordingly. Regarding individual NCD, the greatest decrease in mortality between 2000 and 2019 was from CRD, a 37% drop, then for CVD 27% and cancer 16%. Diabetes mortality slightly increased by 3% over the same period [3]. WPRO achieved the highest decline of CRD mortality (55.9% decrease), at

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the same time the European Region and the Region of the Americas achieved a decrease of up to 43% in mortality caused by CVD [2].

In our previous paper [4], we have demonstrated that the management of CRD was a significant factor in the decrease of the mortality in WPRO, as plenty of WHO global, regional, and national prevention and control activities have been successfully launched and implemented there during the observed period.

Despite some progress in the prevention and management of NCD achieved by WHO globally, the pace of change in the majority of Member States is too slow to reach UN Sustainable Development Goal (SDG) target 3.4, which calls for reducing premature mortality from NCD by one third by the year 2030 comparing with 2015 [5,6]. With the global annual rate of reduction decreasing considerably from 2015 to a little under 1%, we are not on track to reach this goal in time [5]. In this case, comprehensive investigation and broad implementation of the WPRO experience demonstrating best achievements in the prevention of NCD could play a critical role in accelerating global attempts in prevention and management of CRD along with other major NCD to reach in time UN SDG target 3.4.

However, since the beginning of 2020, coronavirus disease has posed a major risk to global health with the impact on human behaviour and the operating of health care systems.

Population's exposure to many behavioural risk factors during the pandemic has changed. For example, government measures such as lockdowns reduced physical activity and changed diets, as many people could not afford recommended foods for many reasons related to the lockdown.

Essential health services underwent massive disintegration caused by epidemic-related social limitations, overwhelming patient workloads, under-resourced health facility infrastructures, and lack of staff, medical equipment, medicines, and diagnostics. Health professionals experienced huge pressure. Excess mortality from 1 January 2020 to 31 December 2021 due to coronavirus disease was around 14.9 million people [2].

As the influence of COVID-19 took place globally, it's extremely important to analyse what was the impact of the COVID-19 on the countrywide NCD management and life style interventions in WPRO where impressive results concerning CRD and other major NCD mortality decline have been achieved before the onset of the epidemic.

The aim of this study was to analyze changes in the WHO NCD prevention efforts based on the "best buy" approach (affordable management and lifestyle modifications) [7] during the main COVID-19 pandemic period in WPRO and other WHO regions with similar levels of economies and identify the most vulnerable areas created by the pandemic.

2. Materials and Methods

The WHO publications and statistics were used for preparing this article. Pre-COVID-19 data were collected between March and June 2019 and published in 2020. The first cases of COVID-19 were registered in December 2019. Post-COVID-19 data were collected in May–September 2021 and published in 2022. World Bank country income classification 2018–2019 is a good estimate of what the world looked like before the epidemic.

2.1. Management of NCD

Assessments of NCD management in the study were based on the existence of primary health care (PHC) and national NCD guidelines outlined in the WHO NCD Action Plan [8].

These evidence-based guidelines/protocols/standards for management of major NCD had to be recognized and endorsed by government or competent authorities. During the assessment of NCD management this indicator was counted as fully achieved and obtained two points if national guidelines have been developed for all four NCD and the country presented the requested supporting documentation.

This indicator was considered as partially achieved and acquired one point when the country had guidelines only for two out of the four NCD.

Counselling and drug therapy questions implied that countries have provision of counselling and drug therapy, for acceptable people at high risk to avoid heart attacks and strokes, with an accent on the PHC level. In case of providing counselling, the country reported this issue as fully achieved and obtained two points; if provided partially, the country reported it as partially achieved and obtained one point. The following were other categories with the 0 point of achievement: DK = country responded "do not know" to that question in the survey, NR = no response to health facilities counselling, NA = not achieved, not applicable to country due to national situation. In case of full implementation of the management questions country obtained four points. The WHO progress monitoring issues are presented in the NCD Progress Monitor 2020 and 2022 [9,10]. Data regarding "best buy" cancer management (vaccination against human papillomavirus and cervical cancer prevention) were not available.

2.2. Lifestyle Modification Measures

Four behavioural risk factors in our study concern tobacco use, unhealthy diet, low physical activity, and harmful use of alcohol.

2.2.1. Tobacco

The following tobacco demand reduction measures (TDRM) according to the WHO Framework Convention on Tobacco Control (FCTC) [11] have been evaluated. 1. Reducing of affordability by increasing excise taxes and prices on tobacco products. 2. Eliminating of exposure to passive tobacco smoke in all indoor working areas, public transport, and public places. 3. Implementing of simple/standardized packaging and big graphic health warnings on all tobacco packages. 4. Enacting and enforcing complete bans on sponsorship, promotion, and advertising of tobacco. 5. Implementing of efficient mass media campaigns educating the society regarding the harms of smoking, including secondhand smoke or tobacco use.

2.2.2. Excessive Use of Alcohol

In accordance with the WHO Global Strategy to Reduce the Harmful Use of Alcohol [12], three alcohol reduction measures have been evaluated. 1. Enaction and enforcement of restrictions on the physical availability of retailed alcohol by reducing hours of sale. 2. Advertising bans in different media, or complete restrictions. 3. Increasing excise taxes on alcoholic beverages.

2.2.3. Unbalanced Diet Reduction Measures

The following measures have been implemented by countries to improve unbalanced diets [13]. 1. Adopted national policies to decrease population salt/sodium intake. 2. Adopted national policies to reduce saturated fatty acids and practically remove industrially produced trans fatty acids (TFA).

2.2.4. Public Education and Awareness Campaign on Physical Activity

At least one recent national mass media campaigns for physical activity behavioural change have been implemented by countries [14].

To make a quantitative analysis of LM achievements we gave 2 points to completely accomplished activities, 1 point to partially accomplished, and 0 points to not accomplished, do not know, or no response answers. For example, if a Member State succeed to organize at least one national/countrywide campaign on low physical activity, it obtained 2 points. If a Member State encouraged community involvement in local actions aimed at increasing the level of physical activity, it received 1 point. A list of five interventions against tobacco use, for instance, could receive ten points in case of their full achievements, six points for

harmful alcohol intake, four for unhealthy diet, and two points for physical activity increasing. Hundred percent implementation of the lifestyle modification measures could bring the country 22 points.

3. Statistical Analysis

We used two sample Student's *t*-test to analyse continuous data presented as mean ± SD. Statistical significance was considered as two-sided p value < 0.05. We did not use a paired *t*-test because, in some cases, countries migrated from initially determined income groups.

4. Results

WPRO consists of 27 countries, 10 of which are high-income countries (HIC) according to the World Bank classification [15]: Australia, Brunei Darussalam, Cook Islands, Japan, Nauru, New Zealand, Niue, Palau, Republic of Korea, and Singapore. 17 countries belong to middle-income countries (MIC): Cambodia, China, Fiji, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Federated States of Micronesia, Mongolia, Papua New Guinea, Philippines, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam. WPRO does not comprise low-income countries. Of the 52 countries in other WHO regions, 86 are HIC, and 86 are MIC.

Regarding the management assessment score (MAS) in HIC both in WPRO and other WHO regions we see no difference between 2020 and 2022 years, 2.40 ±1.26 and 2.83 ± 1.40, (n = 10) t = 0.72, p > 0.05 for WPRO, 2.83 ± 1.32 and 2.88 ± 1.34 (n = 52), t = 0.98, p > 0.05 for other WHO regions. The percentage of accomplishment even increased from 60% in 2020 to 71% in 2022 in WPRO and from 71% to 72% in other WHO regions (Figure 1).

MAS in MIC also increased from 2.00 ± 1.46 to 2.12 ± 1.45, (n = 17), t = 0.24, p > 0.05 in WPRO and from 1.86 ± 1.29 to 2.01 ± 1.26 (n = 86), t = 0.97, p > 0.05 in other WHO regions. The percentage of accomplishment also increased from 50% to 53% in WPRO and from 46% to 50% in other WHO regions (Figure 1).

In WPRO, we observed no statistically significant difference in the MAS between HIC and MIC in 2020 and 2022, however, in other WHO regions, this difference was highly significant, showing better implementation of NCD management in HIC (Figure 1).

Changes in the lifestyle modification measures are presented in the Table 1 Concerning all lifestyle modification measures in HIC of WPRO, no statistically significant difference of the lifestyle modification score (LMS) was observed between 2020 and 2022. The same picture is seen in other WHO regions. Accomplishment level has slightly diminished in WPRO from 44% to 41% and slightly increased in other WHO regions from 57% to 58%. On the other hand, LMS is significantly higher in other WHO regions than in WPRO. In 2020 it's statistically significant at 10% level, t = 1.97, 0.05 < p < 0.1 and in 2022 at 5% level, t = 2.67, p < 0.05. Accordingly, the accomplishment level is higher in other regions 57% against 44% in 2020 and 58% against 41% in 2022.

Better general LMS in other regions did not concern tobacco demand reduction measures (TDRM), where we see practically no difference between 2020 and 2022 in both groups. Accomplishment level remains relatively high at 58% and 54% in WPRO and 56% and 57% in other WHO regions.

No significant changes between 2020 and 2022 were found for the use of alcohol for both groups. Although the accomplishment level was higher in other than WPRO groups 42% against 30%.

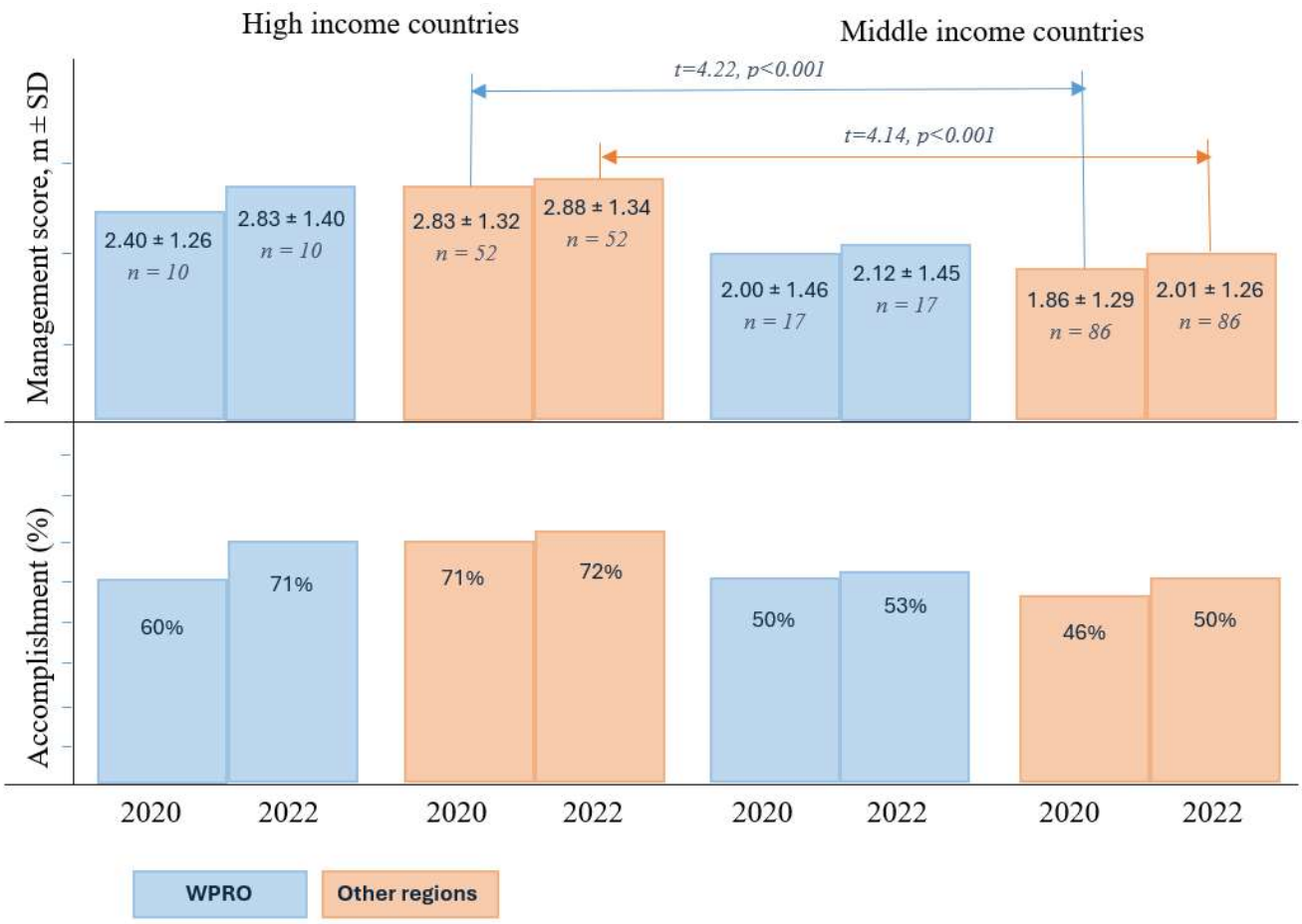


Figure 1. NCD management assessment score and percentage of accomplishment in Western Pacific and Other WHO regions, 2020 and 2022 years.

We can see dramatic difference in the LMS for unhealthy diet between WPRO and other WHO regions. Although there is no difference in LMS in WPRO between 2020 and 2022, and accomplishment level even slightly increased from 28% to 35% the difference in the LMS between WPRO and other WHO regions in 2020 was statistically significant, 1.1 ± 1.5 against 2.8 ± 1.5, $t = 3.28$, $p < 0.001$, and in 2022 1.4 ± 1.3 against 2.8 ± 1.4, $t = 3.08$, $p < 0.01$. Accomplishment level of 70% in other regions remained unchanged in 2020 and 2022.

In the MIC, we can see LMS and accomplishment level are visibly lower than in the HIC. There is no difference in the LMS between 2020 and 2022 for MIC, both in WPRO and other regions. However, LMS in 2022 was statistically significantly higher in other regions than in WPRO, $t = 2.02$, $p < 0.05$.

Accomplishment level of the TDRM slightly improved in WPRO and other regions. Harmful use of alcohol did not change in both groups. Same concerns unhealthy diet reduction measures. Accomplishment level for alcohol and diet remains higher in other regions than in WPRO, Table 1.

Results of the physical activity campaign are presented in Figure 2.

We can see a clear worsening of the situation during the period of the COVID-19 pandemic. There is a visible trend of LMS to decrease from 1.2 ± 1.0 ($n = 9$, data from Japan are missing) to 0.5 ± 0.8 ($n = 10$) in HIC, $t = 1.67$, $p > 0.05$ and a statistically significant decrease from 1.1 ± 0.8 to 0.4 ± 0.8 in MIC ($n = 17$), $t = 2.55$, $p < 0.05$. Accomplishment level has also dramatically decreased from 60% to 25% in HIC and from 55% to 20% in MIC. In other WHO regions, there is no statistically significant decline in LMS, but accomplishment level also decreased from 90% to 80% in HIC and from 55% to 45% in MIC.

Table 1. Lifestyle modification measures score and percent of accomplishment in the WPRO and Other WHO regions, 2020 and 2022.

Measures	HIC WPRO 2020	HIC WPRO 2022	HIC Other Regions 2020	HIC Other Regions 2022	MIC WPRO 2020	MIC WPRO 2022	MIC Other Regions 2020	MIC Other Regions 2022
All measures ***	9.8 ± 4.2 44%	9.1 ± 3.9 41%	12.6 ± 3.6 57%	12.7 ± 4.0 58%	8.4 ± 2.6 38%	8.0 ± 2.4 36%	9.6 ± 4.3 44%	9.5 ± 4.3 43%
Tobacco demand reduction measures	5.8 ± 2.1 58%	5.4 ± 1.6 54%	5.6 ± 2.2 56%	5.7 ± 2.1 57%	4.7 ± 1.2 47%	4.9 ± 1.2 49%	4.4 ± 2.4 44%	4.8 ± 2.3 48%
Harmful use of alcohol reduction measures **	1.8 ± 2.0 30%	1.8 ± 2.0 30%	2.5 ± 1.5 42%	2.5 ± 1.5 42%	2.0 ± 1.4 33%	1.9 ± 1.4 32%	2.9 ± 1.6 48%	2.8 ± 1.6 47%
Unhealthy diet reduction measures *	1.1 ± 1.5 28%	1.4 ± 1.3 35%	2.8 ± 1.5 70%	2.8 ± 1.4 70%	0.6 ± 0.9 15%	0.9 ± 0.8 22%	1.1 ± 1.4 28%	1.0 ± 1.3 25%
* HIC 2020: $t = 3.28$, $p < 0.001$; 2022: $t = 3.08$, $p < 0.01$; MIC 2020: $t = 1.89$, $0.05 < p < 0.1$								
** MIC 2020: $t = 2.37$, $p < 0.05$; 2022: $t = 2.37$, $p < 0.05$								
*** HIC 2020: $t = 1.97$, $0.05 < p < 0.1$; 2022: $t = 2.67$, $p < 0.05$; MIC 2020: $t = 1.52$, $p > 0.05$; 2022: $t = 2.02$, $p < 0.05$								

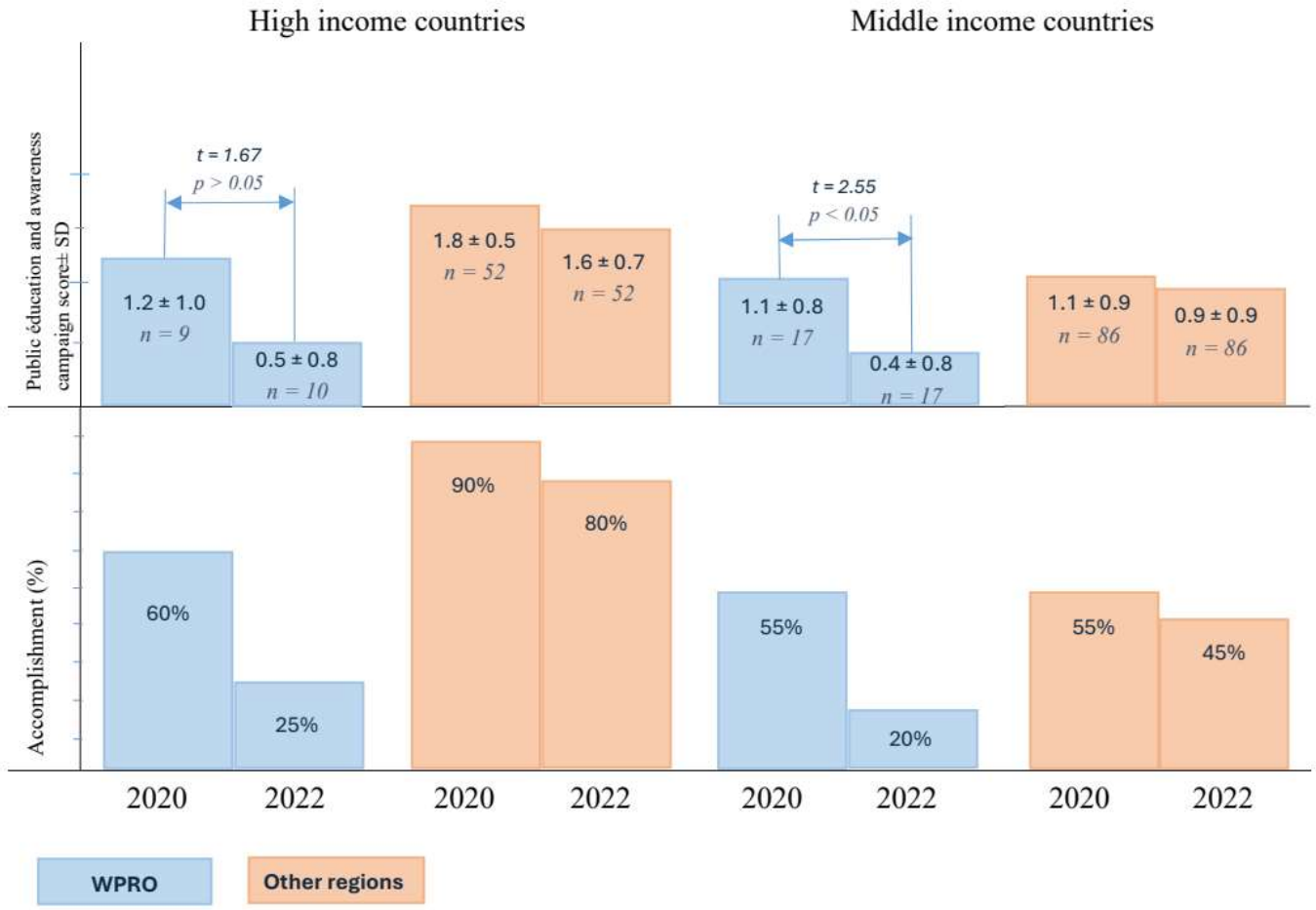


Figure 2. Public education awareness campaign on physical activity score and percentage of accomplishment in the WPRO and Other WHO regions, 2020 and 2022 years.

5. Discussion

Constant growing of the global life expectancy at birth was registered from the start of the millennium until the beginning of pandemic, up from 66.8 years in 2000 to 73.1 years in 2019 [5]. However, the

epidemic revoked this trend and destroyed the made achievements within just a couple of years. The life expectancy at birth for both sexes fell by about 1.7 years during the pandemic [5]. The WPRO demonstrated the smallest impacts over the first two epidemic years, with losses of life expectancy and healthy life expectancy, of less than 0.1 and 0.2 years respectively. The Regions of the Americas and South-East Asia were the most affected WHO Regions where declines were of about 3 years of life expectancy and 2.5 in healthy life expectancy respectively [5].

Although Progress Monitor just demonstrates the progress in achievements of SDG "sufficient" or "in sufficient" we have quantified preventive activities to make a more visible picture of the COVID-19 impact. According to our data, NCD management assessed by the MAS in WPRO did not worsen during the epidemic. The percentage of accomplishment of NCD management in MIC, where the majority of the WPRO population lives, was higher than in other WHO regions both in 2020 and 2022 years (Figure 1). This is significant because NCD patients are prone to acquiring COVID-19; for instance, COPD patients have a higher risk of developing COVID-19 [16–18] and should be well controlled during the pandemic [19–21].

Accomplishment level of NCD management in HIC is higher, than in MIC. In view of this NCD management in MIC both in WPRO and in the regions has a great reserve for its improvement to accelerate achievement of SDG 3.4. Maintaining or improving adequate NCD management achieved before the onset of the COVID-19 epidemic is vital to prevent potential excess NCD mortality due to the pandemic. We hope that COVID-19 did not influence the registered decline of NCD mortality seen in 2019. However, it will become clear when the full picture concerning NCD mortality during the pandemic will be received. So far only 60 countries with reliable vital registration data that are available for 2020 and 2021 presented a mixed picture of NCD premature mortality. Some of them demonstrated further impede of reduction or even increasing mortality from NCD as a result of disruptions to NCD services, on the other hand, some countries saw accelerated decline of premature mortality from NCD. There are still many uncertainties concerning NCD mortality during the COVID-19 epidemic that can only be clarified when more and better cause of death data will be received to confirm the trends during and after the COVID-19 pandemic [5].

To reduce the impact of NCD on individuals and society, a comprehensive approach including primary and secondary prevention is needed. Involvement of all sectors of society, such as health, finance, transport, education, agriculture, planning, and others, is essential to modify lifestyle risk factors such as tobacco use, excessive alcohol intake, low physical activity, and unhealthy diet, and to reduce the risks associated with NCD.

Despite the fact that before the epidemic lifestyle modification measures in general were better implemented in other than WPRO regions, it was important to study during the pandemic the level of accomplishment of more specific for CRD life style modification measures like smoking and physical activity to see whether the changes could appear and, if yes, how to improve them since CRD prevention demonstrated highest decline of mortality. This should expedite the implementation process since our efforts to achieve STG 3.4 by the year 2030 are not on track.

No statistically significant changes were observed for TDRM in WPRO comparing with other WHO regions. The score of TDRM in WPRO MIC even increased in 2022 comparing with 2020, from 47% to 49% same trend was seen for other regions. It demonstrates the sustainable effect of the WHO FCTC [11]. Globally, before the epidemic, the age-standardized prevalence of current tobacco use among people 15 years of age and older has decreased by over 30%—from 32.7% in 2000 to 22.3% in 2020 [3]. Progress was slowest in WPRO, where the decline was only 11.8%, from a comparatively lower prevalence of 27.9% in 2000 to 24.6% in 2020 [22]. The Global Action Plan for the Prevention and Control of NCD has set a target to decrease the prevalence of current tobacco use by 30% between 2010 and 2025 [8]. Thus, WHO actions concerning tobacco are in the right direction to achieve this WHO target.

Low physical activity is one of the ten leading risk factors for global mortality, causing 3.2 million deaths each year [8]. According to WHO, less than 150 min of moderate-intensity physical activity per

week or less than 75 min of vigorous-intensity physical activity per week or equivalent is considered as insufficient physical activity among adults aged 18 years or older [14,23].

It is well known that physical activity is decreased in COPD patients [24,25] and exercise training significantly improves physical activity levels and their prognosis [26,27]. The COVID-19 pandemic has led to a statistically significant decline of community based educational campaigns on physical activity, associated with the lowering of the accomplishment level. This finding is important for further prevention and management of NCD, and is particularly critical for COPD patients, since many pulmonary rehabilitation programs were suspended during the pandemic to reduce the risk of spreading the epidemic [28,29].

Thus, further implementation of the WHO Global Strategy on diet, physical activity and health [13,14], along with the WHO NCD Action Plan [8], with an emphasis on strengthening partnerships between government and civil society, will be key to maintaining and improving physical activity levels in WPRO.

Despite the huge burden caused by CRD and the important role of diet in preventing NCD, less data are available on the effect of diet on CRD [30]. Only saturated fat and salt consumption are included in the WHO assessment of the unhealthy diet reduction measures. These dietary factors have a strong link with the prevention of CVD in particular arterial hypertension and coronary heart disease (CHD) [23,31,32], and they are better implemented in other than WPRO regions (see Table 1). This well corresponds to high decline of CVD mortality (43%) in the Americas and EURO before the epidemic [2]. Despite the fact, that the role of these nutrients in developing of CRD is less convincing than for CVD, certain cancers and diabetes the reported associations in general do not contradict to the WHO recommendations on Diet, Nutrition and the prevention of chronic diseases [31]. Special attention in the dietary prevention of NCD is now paid to trans-fatty acids (TFA) and their control in the diet due to their link with CRD [30] and particularly CHD, where their intake (more than 1% of total calories) is associated with increased risk of CHD [33–35]. TFA appear during the process of partial hydrogenation of polyunsaturated fatty acids. This process creates TFA and also removes the critical double bonds in essential fatty acids. Most TFA are contributed by industrially hardened oils, deep fried fast foods, and baked goods, therefore, they can be found in cookies, cakes, packaged foods, biscuits, spreads, and cooking oils [36]. WHO defined TFA elimination as one of the priority targets in 2018, calling for the global elimination of industrially produced TFA and an obligatory national ban on the production or use of partially hydrogenated oils as a component in all foods [5,33]

The COVID-19 epidemic had an apparent impact on alcohol consumption worldwide, although its magnitude and length remain to be reliably characterized. The preliminary global estimate for total alcohol per capita consumption (APC) in 2020 was 4.9 L [37], compared with 5.5 APC in 2019 [38]. Heavy alcohol intake has a negative impact on pulmonary function [39], is causally linked to eight different cancers, and has a detrimental impact on CVD and other NCD [40].

Harmful use of alcohol reduction measures demonstrated only 30% accomplishment rate in WPRO, which did not change during the pandemic in HIC and slightly decreased from 33% to 32% in MIC. Quite low accomplishment rate shows a big potential to decrease harmful alcohol consumption in the region by the year 2030. This would be beneficial for CRD and other major NCD. Accomplishment rate during the pandemic in other WHO regions also practically did not change. However, it remained higher than in WPRO both in HIC and MIC (42% in HIC in both 2020 and 2022, and 47% and 48% in MIC, respectively).

Our study has demonstrated that the encouraging situation with the prevention of CRD and NCD in WPRO did not worsen during the COVID-19 epidemic. The accomplishment rate for NCD management has a trend to increase both in HIC and MIC. Management score and accomplishment level in MIC remains higher in WPRO than in other WHO regions. This confirms our previous finding that NCD management played a key role in achieving significant reductions in NCDs and, in particular, CRD mortality in the region before the epidemic.

From a primary prevention perspective, TDRM remain better implemented in WPRO MIC than in other WHO regions. Heavy alcohol intake reduction and healthy diet recommendations are better implemented in other WHO regions. Dramatic deterioration of the situation concerning public education campaigns on physical activity during the epidemic has happened globally and especially in WPRO. In view of this, it's critical to reestablish these activities to maintain achievements reached in the region before the COVID-19 epidemic.

6. Conclusions

Better implementation of preventive measures in HIC, especially for NCD management and unhealthy diet reduction, shows that people in less-resourced settings still have limited access to a wide range of services and technologies linked to primary and secondary prevention of chronic diseases. Inequalities restrain progress in responding to global crises as has been shown during the COVID-19 pandemic and slow down achieving of the SDG 3.4 target.

Since the current epidemic of chronic diseases makes COVID-19 often fatal, strengthening NCD prevention and control is the best preparedness approach. Countries must take urgent action to anticipate and respond to health challenges, particularly in lower-income countries, to guide effective public health policy setting and programme implementation. The world must take into account the lessons and experience in the prevention of CRD in WPRO gained during the COVID-19 epidemic to avoid unnecessary deaths and illness and successfully reach SDG 3.4.

Author Contributions

Conceptualization: N.K. and S.A., Methodology N.K. and S.A., Software N.K. and S.A., Validation N.K., Formal analysis N.K. and S.A., Writing—Review and Editing N.K. and S.A.

Ethics Statement

The study was conducted according to the guidelines of the Declaration of Helsinkii.

Informed Consent Statement

Not applicable.

Data Availability Statement

Not applicable.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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