Exploring Barriers and Enablers for Medical Doctors' Motivation to Work during the COVID-19 Pandemic in Zimbabwe

A Study of Hospitals in Midlands Province, Zimbabwe

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A thesis submitted in partial fulfilment of the requirement for the degree of
Master of Science in International Health
by *Dieke van der Windt*

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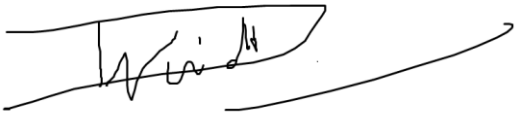

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Abstract (262 words)

BACKGROUND: The COVID-19 pandemic causes long-term stress and is a large contributor to health workers shortage in the already strained Zimbabwean health system. Motivation to work is a key determinant for improving health care workers' performance.

METHODS: This primary field study was conducted in Midlands province Zimbabwe to explore aspects of motivation of non-specialist medical doctors working. Sixteen non-specialist medical doctors completed an electronic survey with sixteen statements concerning the motivational spectrum of the self-determination theory. Supplemental, four interviews were conducted online and literature study was done.

RESULTS: The migration rate for medical doctors tripled during the COVID pandemic, comparing 2020 with 2019. Statistical analysis of the motivational aspect showed a significant impact of COVID-19 on amotivating factors. A positive correlation was found in wanting to succeed and their job being a fundamental part of them. The work self-determination index for the overall group reflected possible low organizational commitment, low job satisfaction and low retention. Remuneration, stigma, anxiety, shortage of staff, work strain, fear of transmitting it to own relatives, insecurity and shortage of supplies were mentioned as large demotivators. Motivators were support of management, teamwork, learning abilities, supervision, availability of protective equipment and improvement of facilities.

DISCUSSION: This study provides a broad picture of the motivation to work and the impact by the COVID-19 pandemic on non-specialist medical doctors in Midlands Zimbabwe. The findings acknowledge the growing problem of remuneration and motivation to work and with that severe risk for resignation. There is need for improving remuneration and workload to retain the current medical doctors and improve self-determination by participatory leadership.

Key words: motivation, doctor, Zimbabwe, COVID, migration

Total word count: 12 037

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Abbreviations

COVID(-19)	The disease caused by the SARS-CoV-2 (2019-nCoV) coronavirus
DMO	District Medical Officer
GMO	Governmental Medical Officer
HCW	Health Care Worker(s)
IPC	Infection, Prevention and Control
JRMO	Junior Resident Medical Officer
KI	Key informant
KIT	Royal Tropical Institute Amsterdam, the Netherlands
MoHCC	Ministry of Health and Child Care
MRCZ	Medical Research Council of Zimbabwe
OECD	Organisation for Economic Cooperation and Development
PMD	Provincial Medical Director
PPE	Personal Protective Equipment
RBF	Result Based Funding
REC	Research and Ethics Committee, KIT
SDT	Self Determination Theory
SRMO	Senior Resident Medical Officer
UNICEF	United Nations Children's Fund
W-SDI	Work Self-Determination Index
WHO	World Health Organization

Important definitions

Motivation to work	The intrinsic and extrinsic forces to work, the willingness to work, the desire to work, the commitment to work
Non-specialist medical doctors	All doctors that are not specialists yet, meaning JRMO, SRMO and GMO. DMO and medical superintendents work in most settings as GMO as well.
Remuneration	Payment for work or services. It may include salary, but also bonuses, commissions, incentives, top-ups, or any other payment

BACKGROUND

Introduction Zimbabwe

The current estimation of the size of the population in Zimbabwe is 15.2 million.[1] About 65 percent of the population lives rural.[2] Midlands province is one of ten provinces in Zimbabwe and consists of 8 districts with a population of 1.6 million people (Figure 1).[3] Next to the severe draught due to cyclone Idai in 2019, Zimbabwe is going through a severe economic crisis, worsened by the COVID-19 pandemic. High inflation (over 700 percent) since the introduction of the Zimbabwean Bond Note in 2016, severe fuel shortages, food insecurity and over 40 percent of the population in extreme poverty put a huge pressure on the health care system. The estimation is that due to the lock-down measures during the pandemic and continuing economic hardship, the percentage of the population in extreme poverty will increase.[4] There is a large diaspora of Zimbabweans of around 3-4 million people, and they transferred over USD 1.6 Billion to relatives in Zimbabwe over the period of 2020-2021.[5]

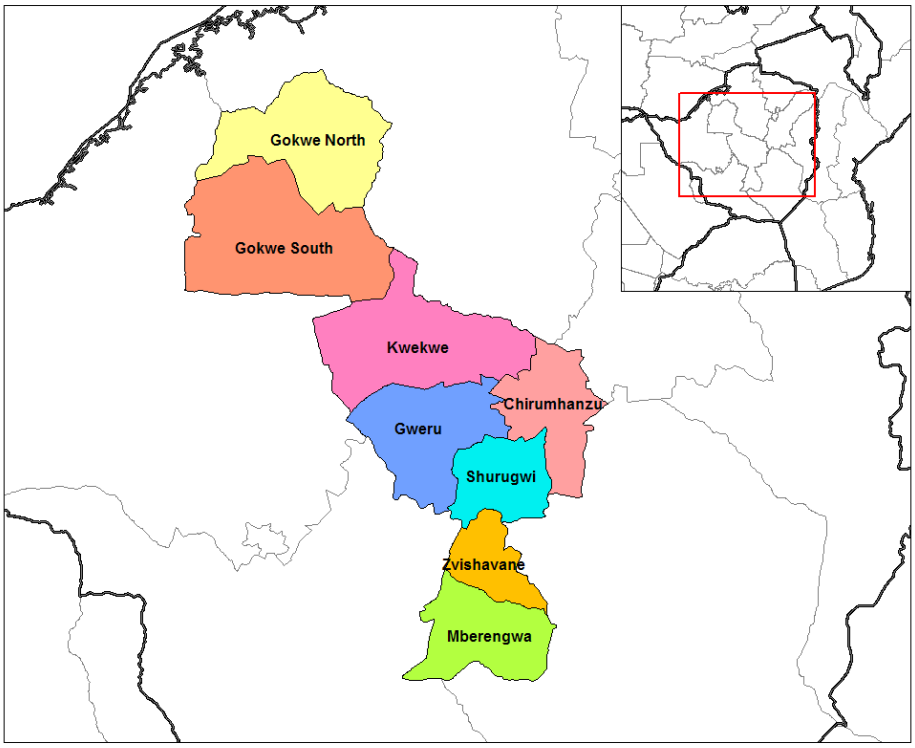


Figure 1. Zimbabwe as landlocked country between Mozambique, Zambia, Botswana and South Africa. Midlands province is one of the ten provinces in Zimbabwe and consists of 8 districts with a total population of 1.6 million people.[3 6]

Health system and health care workers

Health care services in Zimbabwe are provided by public or private and semi-public hospitals like faith-based facilities.[2] The public sector in Zimbabwe is still scarce of doctors and nurses compared neighboring countries and World Health Organization (WHO) standards.[2 7] Figure 2 shows the workforce density for every province in Zimbabwe against the WHO set target. Migration of health care workers (HCW), the ongoing brain drain, was up to 34% for nurses and midwives and 11% for medical doctors in Zimbabwe in 2006 and continues.[8] The WHO indicator for number of medical doctors per 10 000 people is at 23 per 10 000 people. In 2019 Zimbabwe had 2.1 medical doctors per 10 000 people (see Figure 2 for the overall health workforce).[7] The vacancy rate in 2012 was estimated 52 percent for medical doctors.[2]

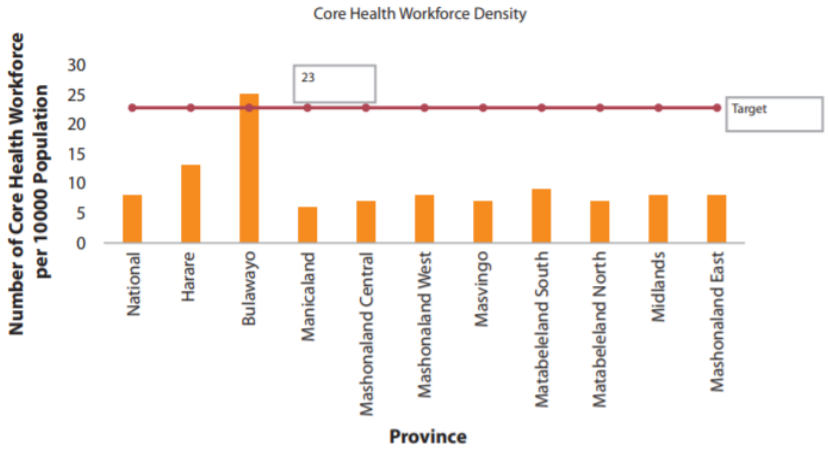


Figure 2. Number of core health workforce density per 10 000 people in every province of Zimbabwe in 2015.[9]

Migration to greener pastures is an ongoing burden on the health care workforce and negatively impacts the health system.[10] In order to stop the brain drain, the government introduced regulations that junior doctors only receive a practice certificate after completing a bonding period of a year in a district hospital or several years in a public hospital in the city.[2] Without addressing the performance of the current staff, retention, re-attraction of migrated staff or new recruitment strategies will have limited effect (factors Figure 3).[8 9] Between 2014 and 2018, (junior) doctors and medical graduates, were on strike four times and the nurses went on strike twice requesting better remuneration and improved working conditions.[11] Optimizing motivation and job satisfaction are important factors for retention of the HCW and to provide quality of care.[12] In 2020, medical doctors only started working again after a long strike of almost 12 months when a donor (a Zimbabwean businessman) agreed to top up salaries for each doctor on top of the government salaries.[13] Access to health is very difficult to improve with HCW strikes.[11] In 2010 the WHO Global Code of Practice on international recruitment of health personnel was adopted by 193 member states to tackle the shortage of HCW in low-and-middle-income countries. With this code of practice, countries were urged to meet their work force needs and Zimbabwe promised to address factors contributing the retention and development of the health workforce.[14]

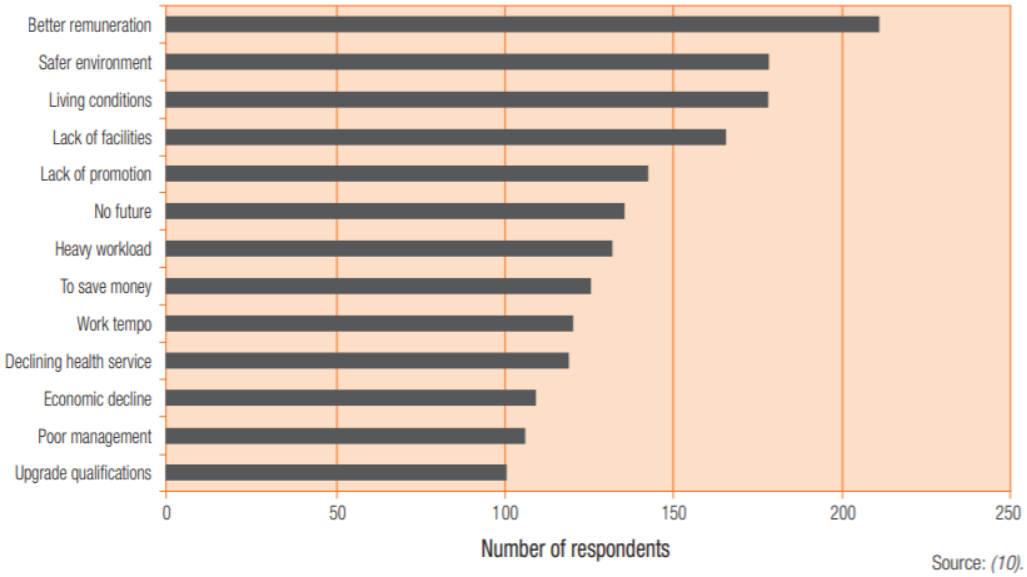


Figure 3. *Push* factors for migrating HCW from Zambia, Zimbabwe, Cameroon and South-Africa selected in 2006 to emphasize migration shifts from brain drain to gain to "fatal flows".[8]

Over the past decade, result-based funding (RBF) (also known as performance-based financing) was implemented in health system strengthening and quality improvement.[15] Unfortunately, RBF was not effective to improve motivation since it was introduced in a system that was already chronically weak and the entire country was struggling an ongoing severe economic decline.[16] Many facilities were struggling with a high workload and staff shortages leading to material and human constraints and resulting in continuous reduced quality of care, frustration and low motivation.[16] Shortage of HCW leads to a poor functioning of the

health system and limited access to health care leading to deterioration of population's health and health inequities. [2 7] Human resources in health should be the most important topic of The National Health Strategy (2021 – 2025) of Zimbabwe since it is the most instable factor to reach universal health coverage.[17]

Motivation of health care workers

Health workforce is one of the six building blocks for a health system.[18] Health workforce is an important component of delivering quality services and attaining universal health coverage.[19] WHO divides health workforce performance in four dimensions: availability, competence, responsiveness and productivity.[8] Service quality, equity and willingness of the HCW to provide services and be available are highly dependent on the workers' motivation.[20] Motivation to work may be defined as the degree of willingness of an individual, arising or stimulated from an internal psychological process or from a broader societal environment, to put effort or maintain energy towards organizational goals or shape the form, intensity and duration of workrelated behaviour.[20 21] Organizational performance increases with high levels of health workers motivation. For HCW, like nurses, it has been shown that burn-out, problems with staff turnover and job satisfaction are all factors related to motivation to work.[20 21]

In low-and-middle-income countries, there are continuing challenges in human resources for health management (like maldistribution, retention issues, shortage and limited possibilities for workforce evaluation) and thus for the progress in universal health coverage. Low motivation leads to sick leaves and decreased performance and high motivation to work leads to improved performance. This will be reflected by similar financial consequences. To improve the quality of care in a low resource setting, motivation needs to be addressed to improve response and support of the health needs of the population by offering the best quality of care.[21 22] After evaluation of the RBF program and the monetary rewards that came with the results every quarter, HCW were reported as being less motivated.[23] The motivation of the HCW in Zimbabwe went down on leadership of facilities, work environment, recognition, autonomy, teamwork, self-concept, change in facility and well-being. An explanation for this could be the weakness of the existing system for which RBF does not compensate since it does not address the gaps and deficits in the health system. The key demotivator for HCW in the RBF program were problems with leadership.[16] Even though, (social) media attention is alarming for the deteriorating health system, motivation has not been addressed enough. In Benin and Kenya, the possibility of non-financial motivators was investigated, distinguishing motivation in 'will-do' and 'can-do'. Possible non-financial motivators were supervision, recognition, leadership, training and participation.[24] Another non-financial possibility would be participatory leadership, or empowering leadership, to improve autonomous work and improvement of self-management.[25] Health workforce has an important role in the preparedness and response to crisis like the current COVID-19 pandemic.[12]

PROBLEM STATEMENT AND JUSTIFICATION

With the global COVID-19 pandemic, the combination of the *Push* factors (inadequate equipment and consumables, poor remuneration and decreased livelihoods for medical doctors and the poor infection control) and the relaxation of the immigration process abroad, the brain drain in Zimbabwe increased.[26] Shortages of staff and equipment increase the burden upon remaining HCW.[27] The global number of publications on the impact of COVID-19 on HCW wellbeing and front line workers mental state are increasing. Motivation to work remains an important topic because it is a key determinant for improving HCW' performance.[28] High motivation is associated with less burn-out, higher retention, better performance and less staff turnover. The composition of factors that influence motivation is highly context dependent. Therefore, selecting drivers and actions attached to this motivation are time bound and difficult to generalize.[29]

COVID and motivation to work in global perspective

Beginning 2020, a novel coronavirus, SARS-CoV-2, is causing a severe global pandemic due to the transmission rate and fast route of the virus, the large public susceptibility, the unavailability of possible vaccination and inadequate knowledge on how the virus precisely works.[30] The COVID-19 pandemic causes stress, long-term stress, and additional risk for the mental and physical health and emotional well-being for clinicians.[31] The COVID-19 pandemic is currently defined of as a longstanding source of anxiety and stress for the population. Lockdown measures, managing infection control measures, outbreak management, social distancing, personal protective equipment, regulatory protocol about wearing face masks and health checks have been and still are major sources of stress at individual and community levels.[32] Crisis leadership includes motivating others, supporting each other and improve the efforts as a team.[33] To encourage the motivation to continue working during the pandemic, adequate protective equipment is considered most important. Especially, medical staff with young families at home were worried about transmitting the virus to their family. The most important motivational factor, that HCW during the first months of the pandemic in China reported, were their professional obligation and social and moral responsibility to work and support others.[34] A small research that was conducted on HCW in Indonesia showed factors that increased and reduced stress and coping mechanisms. They emphasized the importance of adequate support to maintain or increase productivity and motivation.[35] Mukherjee (2020) presented a framework with challenges in a low-resource setting in India and divided these challenges in system factors, organizational factors and individual factors. These factors influence motivation of HCW and addressing motivation of HCW should be prioritized, starting with addressing psycho-emotional needs of the staff.[36] Indonesian HCW were shown to cope with stress through searching for more information on COVID-19 and trying to keep a positive attitude to motivate themselves.[35] After a literature search, Cersich *et al.* came up with ten priority interventions to maintain, secure and improve African health care front line workers well-being during the COVID-19 pandemic. These interventions include securing personal protective equipment and finance, but also politicians and public figures to show appreciation and acknowledgement of the efforts of HCW during the outbreak.[37]

COVID-19 and Zimbabwe

With a few positive cases only, Zimbabwe introduced a complete lockdown from March to October 2020. The COVID-19 trend in Zimbabwe was quite different from other countries. The first case was registered on 20 March 2020 going up to 56 confirmed cases two months later. With only a case fatality rate of 1% the first four months, COVID-19 was still quite gentle.[30] The third wave for Zimbabwe showed a huge increase in new cases up to 120 000 cases in total at the end of July 2021 with a case fatality of 3.4-3.6%. Drivers of the COVID-19 waves were more transmissible variants, surveillance challenges, pandemic fatigue, transport challenges for patients, but also challenges in the public health sector.[38] [39] [40] Preparation of isolation units and COVID-19 wards started, but possibilities to test and personal protective equipment (PPE) were lacking. When the real outbreak started January 2021, a supportive work environment showed importance to maintain resilience of the HCW, especially front-line workers including medical doctors.[31]

The COVID-19 outbreak in Zimbabwe was characterized by Infodemics and a long strict lock-down. The explosion of sharing information on social media and self-information, but also the risk of misinforming and an over-abundance of information, accurate and inaccurate. Infodemics cause distress and increase anxiety and the risk for depression.[41] In a small qualitative analysis by interviewing community health workers, Mackworth-Young supported that individuals were overinformed without reliable sources leading to fear and a lot of unanswered questions.[42] To increase protection of HCW, additional HCW were mobilized and a COVID-19 monthly financial incentive was introduced for the front-liners, but there was need for increasing testing capacity and addressing corruption in the health system.[43] There was severe concern that a possible outbreak might overwhelm a very weak health care system.[44] With the lockdown, transport was unavailable, food prices went up, availability of nutritious food went down and income went down.[45] Direct implications of

COVID-19 infections in HCW lead to staff shortages because of several reasons; 1) isolation and treatment period, 2) hospitalization, 3) quarantine for all contacts, 4) mortality or 5) long COVID-19 and prolonged illness. Indirect implications are the results of the increasing pressure on the system, the consequences for supportive system and the even more increased shortages of HCW. The burden among HCW was quite significant. There is a higher infection rate among HCW, a pooled prevalence of 11% by PCR testing. PCR testing is not routinely available in low-to-middle income countries because of the expenses.[27]

Local research in Zimbabwe to explore motivation from the pre-COVID-19-era, psychiatric trainees (nurses) also show that even though there are shortages of information, salaries, trainers, education and service, people were still eager to practice since they were motivated by family, loyalty to the nation, helping the vulnerable and stigmatized individuals.[46] There is little attention in literature going towards addressing non-financial motivation of medical doctors in Zimbabwe and focus is mainly on strikes and salary. To present a clear picture on the importance of the motivation to work by medical doctors, the *Push* and *Pull* factors are important to understand. *Push* factors are defined as factors unfavorable in home country, possible drivers to leave. *Pull* factors are defined as favorable in destination country, possible attractions to leave. After understanding the *Push* and *Pull* factors, there will be need to address *Stick* and *Stay* factors. *Stick* factors being defined as factors to stick in the home country and *Stay* factors being reasons to stay in the destination country.[47] Which intrinsic and extrinsic factors are important for the motivation of non-specialist medical doctors in Zimbabwe during the COVID-19 pandemic? What factors are especially demotivating? What are their suggestions for how to address their motivation?

OBJECTIVES

Overall goal of the research

To assess aspects of motivation of medical doctors working in in a government hospital (public or public-private partnership) Midlands Province Zimbabwe during the COVID-19 pandemic in order to measure the impact of COVID-19 on motivation to work of these medical doctors.

Specific objectives of the research:

- To assess motivation to work of non-specialist medical doctors in a government hospital (public or public-private partnership) during the COVID-19 pandemic in Midlands Province Zimbabwe.
- To identify motivational and demotivational factors for non-specialist medical doctors to work in a government hospital (public or public-private partnership) during the COVID-19 pandemic in Midlands Province Zimbabwe.
- To identity motivational factors during the COVID-19 pandemic that changed motivation to work of non-specialist medical doctors in a government hospital (public or public-private partnership) in Midlands Province Zimbabwe.
- To explore the changes in motivation to work of non-specialist medical doctors in a government hospital (public or public-private partnership) during the COVID-19 pandemic in Midlands Province Zimbabwe.

METHODOLOGY AND ANALYTHICAL FRAMEWORK

This field study is a mixed methods of a quantitative survey, supplemented with key informant interviews and a literature study. Primary data was collected on the motivation to work of non-specialist medical doctors during the COVID-19 pandemic in Midlands province Zimbabwe. For ethical approval guidelines by the Research Ethics Committee from KIT Amsterdam were followed. After support from the Provincial Medical Director (PMD) of Midlands Province Zimbabwe the research proposal was approved by the Medical Research Council Zimbabwe (MRCZ).

Study location All primary data were collected in Midlands Province, Zimbabwe (Figure 1). The electronic surveys and key interviews were all conducted online to avoid physical contact and reduce risk of transmitting the SARS-CoV-2-virus for the participants and researcher (see Timeline in Figure 4.).

The sample population are non-specialist medical doctors working at public and semi-public hospitals in Midlands province Zimbabwe. Medical doctors in Zimbabwe working at faith-based hospitals are paid by the government and for the medical aspect are working under the provincial medical director (PMD). Therefor they will be exposed to similar motivational factors as their colleagues at public hospitals. Doctors in training to become a specialist were also included since they do not have specialist salaries yet. Specialist doctors and consultants were excluded since they have possibilities to have a private clinic, different status and extra sources of income.

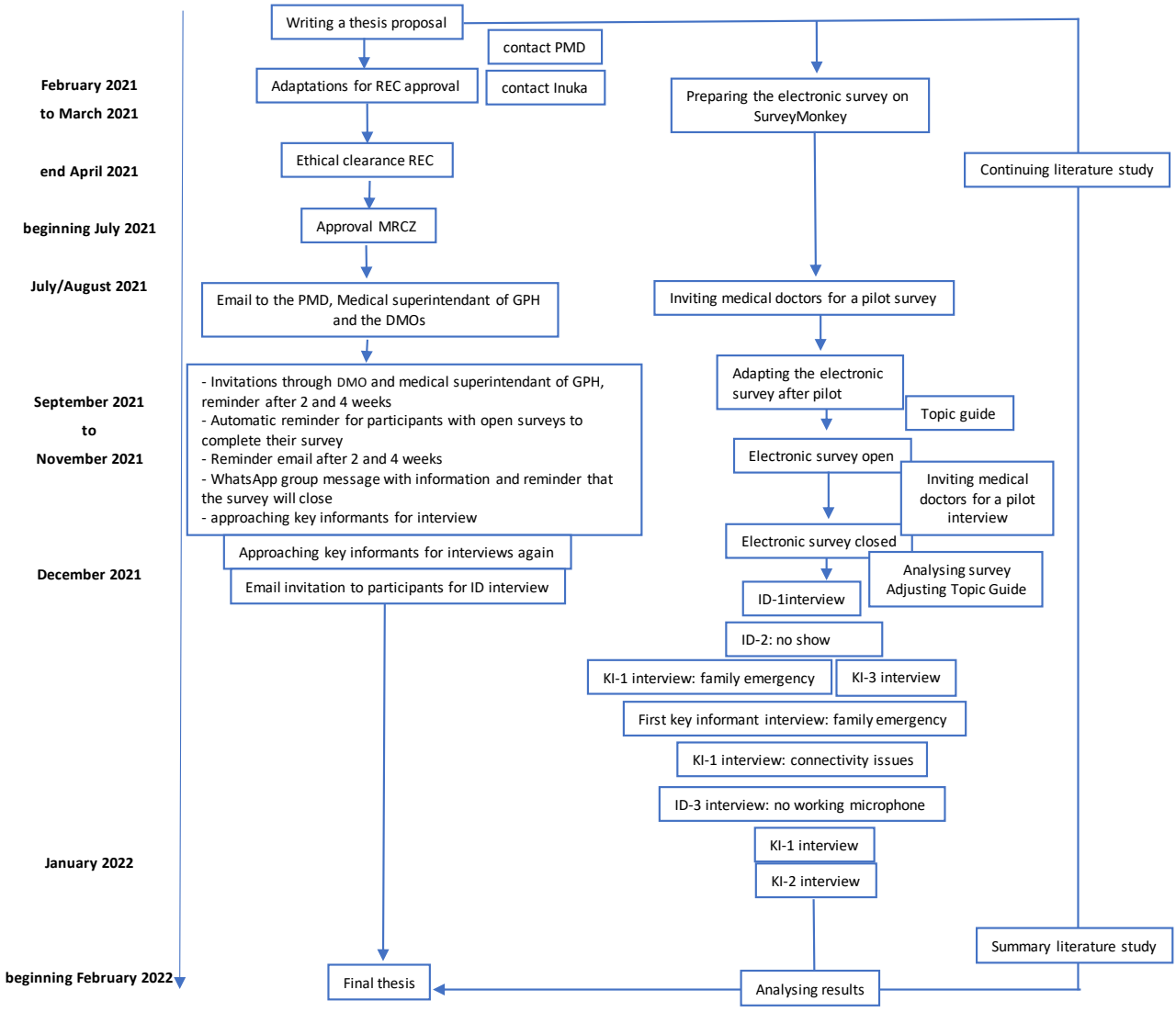


Figure 4. Draft of research activities and timeline showing delays in the initial timeline. Most important delays were the result of difficulties in recruitment and conducting the interviews.

Literature study

When the thesis proposal was accepted by the REC and MRCZ, very little was published on HCW motivation in Zimbabwe, during the COVID-19 pandemic. During the period of conducting the electronic survey and the interviews, more literature became available. The literature on the impact of COVID-19 and HCW migrating was a rising issue, especially in the perspective of the WHO code of practice and the increasing attention for decolonization. [14]

Literature was searched through PubMed, Google Scholar and VU Library, using terms as medical doctors OR health care workers OR health workforce AND migration OR retention AND COVID with or without Zimbabwe. Through snowballing, references were checked to find other sources of information. There were several points that were necessary in the sources:

- COVID-19 pandemic related (year 2020 to 2022)
- Related HCW or medical doctors
- It should cover motivation, migration or retention
- limited to Zimbabwe or Sub-Saharan Africa
- English language

Quantitative study

Motivational factors are the primary topic of this thesis. Motivation is a complex and multi-dimensional process with need of a multi-disciplinary approach. There are several external and internal factors that influence motivation.[20] An electronic survey was conducted to explore the different aspects of motivation according to the self-determination theory (SDT). COVID-19 related statements were added to measure the impact of the COVID-19 pandemic on motivation. There are several theories on intrinsic and extrinsic factors of motivation, like Maslow's Hierarchy of Needs, Self-determination Theory by Ryan and Deci, Cognitive Evaluation Theory by Porter and Lawler and the Two-Factor (Hygiene) theory of Herzberg.[50] Discussions on how to measure motivation are still ongoing. The Self-Determination Theory taxonomy has been validated, including in some low-and-middle-income countries (Figure 5).[48] The questions from the electronic survey are based on the validated questionnaires from Temblay (2009) and Lohmann (2017).[49 49] See Annex 1.1. With the electronic survey these motivational factors will explored using the taxonomy described in Figure 5 and their impact on the motivation to work during the COVID-19 pandemic from intrinsic factors working positive to amotivational factors working negative on motivation to work.

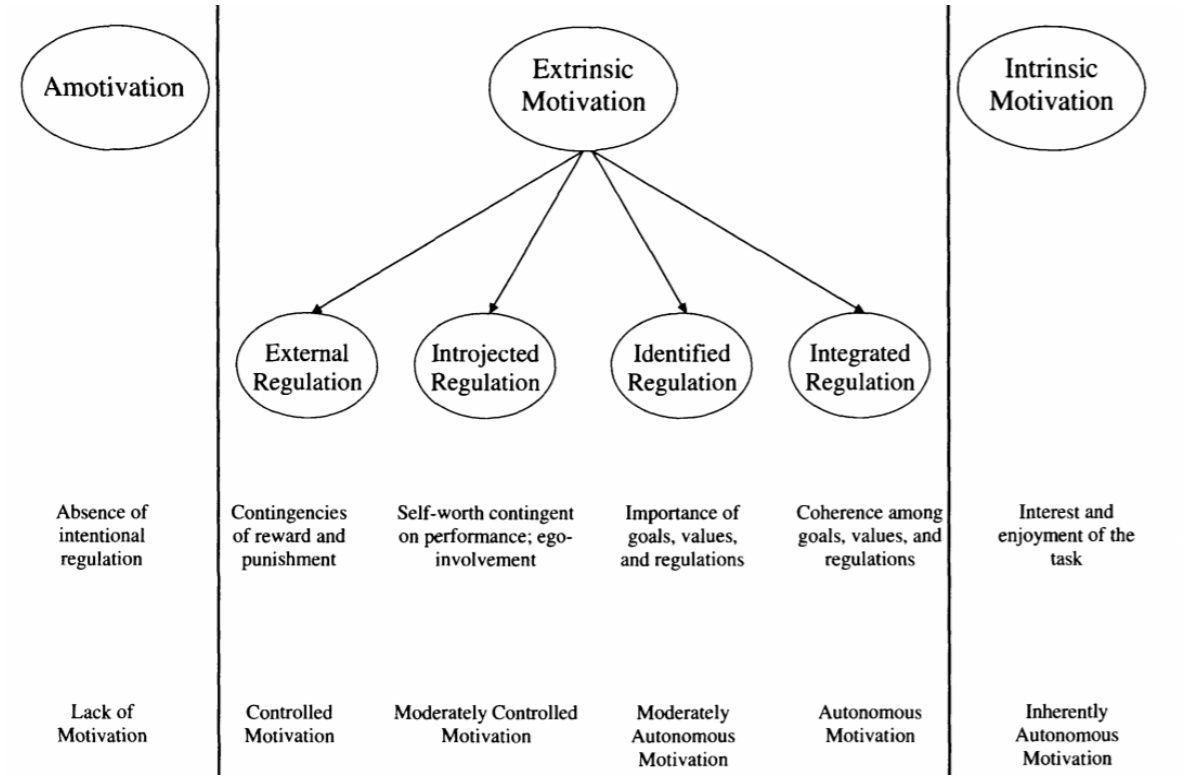


Figure 5. Self-determination continuum: from amotivation (completely no self-determination) through different types of extrinsic motivation to intrinsic motivation. [50] Accoding to this taxonomy intrinsic motivation will have the most positive

impact on motivation, followed by integrated and identified regulation. Scoring high on amotivation will have negative effect on general motivation to work and can lead to resignation or inefficient performance.[50]

The electronic survey was designed through Survey Monkey. The sample characteristics included variables as sex, salary, age, work experience, hospital and position. The last two characteristics were asked to check if the doctors were non-specialist medical doctors. Motivation is divided in 3 main categories with a continuum in between, amotivation, extrinsic motivation and intrinsic motivation. First, intrinsic motivation refers to motivation that originates from within the person, like enjoyment. Extrinsic motivation derives from the wish to avoid or attain the outcome or consequence, like financial benefits. A Self Determination Theory-based scale has been validated to measure the composition of HCW motivation with modifications by Lohmann et all for their research in Malawi, being one low-income, English speaking and Sub-Saharan Africa. For this study, statements from Lohmann (2018) have been used.[49 51]

Franco et al. showed that by using the self-determination theory you can visualize how complex the process of motivation is and internal individual determinant are central to this process; the sense of willingness and ability (Figure 6).[20]

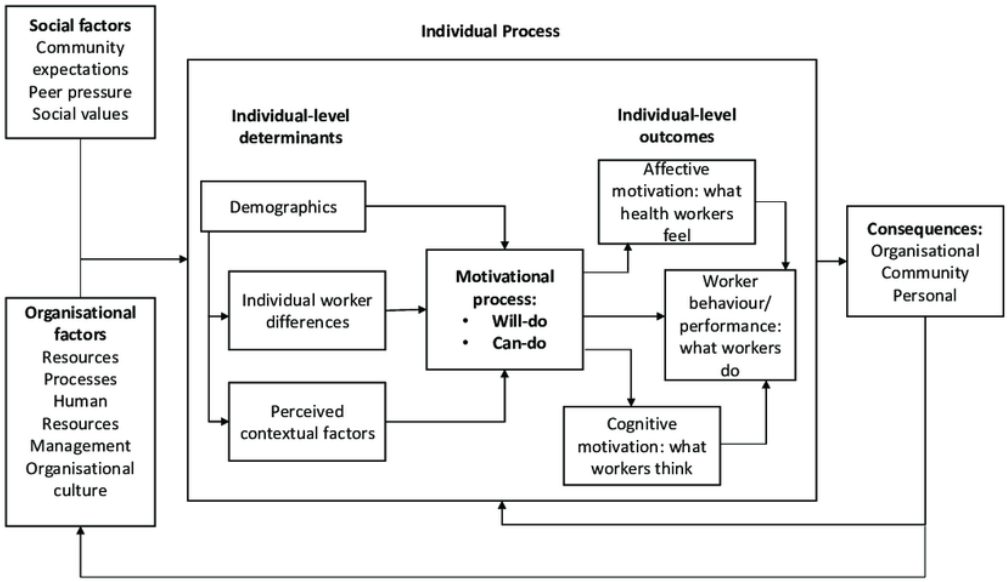


Figure 6. Franco's framework of motivation and the determinants associated with motivational process factors on 'will-do' and 'can-do', figure adjusted by Maini et al. This framework was adjusted and made available in preprint.[20 28]

This framework was used to interpret the results from the questionnaire to create a larger picture of the various determinants that influence motivation. This research will try to address this as the *Push* and *Pull* factors regarding motivation to work and their effect on retention.

2 open ended questions were added to the electronic survey to get the basic of what the participants themselves would add about motivational factors during COVID-19 to anticipate for a small sample size in electronic survey responses and possible interview participants. For the pilot of the electronic survey, 14 non-specialist medical doctors were approached. A pilot was conducted with 5 governmental medical officers from other provinces than Midlands province in Zimbabwe to check reliability and validity. Adaptations to the survey are visible in box 1. Participants for a pilot in-depth interview were searched but none of the participants of the electronic survey pilot were available for an interview.

Adaptation of the survey	**Clarification**	**Constraint of the adaption**
Question on characteristics of the participant – split into multiple questions	In one question there were multiple possibilities to select gender, workplace and age. This was leading to unclear answers and caused confusion with the pilot participants.	More questions
Estimation of monthly allowance in ZWL$ - removed	Some of the participants put non applicable to that and others will put a number there that would be changing every month and would not reflect the salary.	There were no questions on the height of the salary.
Estimation of monthly extra income from top-ups, incentive, locum, etc. State currency as well - removed	This question was removed since it would be difficult to compare different currencies with changing rate of the Zimbabwean dollar. Next to this, the pilot participants stated that there was no steady monthly income on the extra	There were no questions on access to extra financial incentives, either local or possibilities for locum.

	income and it would be unclear if participants would like to write an answer	
Formulation of question: With COVID-19, my work was still a fundamental part of who I am	With COVID-19, my work is still a fundamental part of who I am.	No constraint
Formulation of question: I don't know why I work in this job, too much is expected of us.	"In this job too much is expected of us." The pilot participants stated they the question was too confusing to answer a question that started with I don't know why…	The question was adapted in a way where it is unclear if this would still be considered as reversed amotivation subscale
Did the COVID pandemic change your motivation to work? If yes, how:	This question was considered leading. This question was changed into "Did the COVID pandemic change your motivation to work? How?"	No constraint

Box 1. Changes made to the electronic survey after the piloting of the survey.

Recruitment of participants: The participants were purposively selected through contacts of the eight district medical officers (DMOs) and the medical superintendent of Gweru Provincial Hospital (GPH). An estimation of around 70 non-specialist medical doctors should have received the invitation for the electronic survey. The DMOs and medical superintendents were requested to forward the email with the invitation to the electronic survey to their junior resident medical officers (JRMO) and governmental medical officers (GMO). The DMOs were also requested to complete the survey. The participants received a reminder every 2 weeks when they did not complete the survey. Group messages with the invitation to the survey were shared in 2 medical doctor WhatsApp groups of Midlands province. When there were no new responses for 6 weeks, the electronic survey was closed.

Data processing

Electronic surveys were saved anonymous and stored safely in a folder with a password on the researcher's computer. Results were saved in pdf and excel files. Data was imported in SPSS for statistical analysis and for some formulas excel was used. The questionnaires will be kept for five years. The motivational statements in the electronic survey were categorized and numbered according to the motivational continuum; amotivation, external regulation, introjected regulation, identified regulation, integrated regulation and intrinsic regulation.

Statistical analysis: Statistical analysis included cross checking for relation in gender, age, workplace, position and work experience. The answers to the statements were rated according to a 5-point Likert scale from 0 for extreme negative to 5 for extreme positive. There will be a sixth option for "respondent does not wish to answer". The overall data from the Likert scales were considered as interval data, therefore parametric tests were used.[50] Statements 4, 11 and 15 were reversed since they reflected reversed amotivation. Statistical analysis was conducted to check if the answers were different to the mean and which side of the impact on motivation: negative or positive. Pearsons r was used for statistical analysis of all cross checking for significance between the variables within a motivational scale and for comparing the motivational statement with the COVID-19 derivative question. Pearsons chi square was used to compare the demographic characteristics with the statements. The W-SDI was calculated and Pearsons chi square was used to analyze the W-SDI scores with demographic characteristics.

Work self-determination index

A work self-determination index (W-SDI) was calculated for the sample population to see if the general research population showed a tendency toward self-determination or non-self-determination profile. W-SDI is a way of looking at the motivation as a multidimensional score. The formula for determining the W-SDI is found in Box 3.

W-SDI=(+3xIM)+(+2xINTEG)+(+1xIDEN)+(-1xINTRO)+(-2xEXT)+(-3xAMO)		Calculating statement means
IM	intrinsic motivation	(3 + 8 + 13) /3
INTEG	integrated motivation	(5 + 9 + 16) /3
IDEN	identified regulation	(2 + 7) /2
INTRO	introjected regulation	(6 + 10 + 12) /3
EXT	external regulation	(1 + 14) /2
AMO	amotivation	(4 + 11 + 15) /3

Box 2. Formula to calculate the work self-determination index by using the mean of the answers to the different statements connected to the motivational scale. [50]

The mean score on every motivational question will be used in the formula representing the motivation. Using the 5-point Likert scale the range for possible scores is +/-24. A high W-SDI would mean less risk of work strain and job turnover intentions and more positive effect to organizational engagement and job satisfaction depending on once self-determination. A low W-SDI means more deviant behavior, like acting

antisocial. There is no clear negative correlation on organizational commitment or job satisfaction.[50] People with a strong self-concept are more likely to accept organizational difficulties and show more persistence.[20]

Qualitative study

Participants and procedure for key informant interviews

During the period awaiting the results of the electronic survey, key informants were approached to be interviewed to discuss the start of the COVID-19 pandemic, their view about the motivation to work by their staff and their perspective on possibilities to address the factors influencing motivation to work. 4 Key Informant interviews were conducted: the Provincial Medical Director, the acting Provincial Medical Director during the start of the COVID-19 outbreak, a governmental medical officer (non-specialist medical doctor) and the medical superintendent of Gweru Provincial Hospital. All key informant interviews were unstructured, to get a much depth as possible. The results of the survey were included in the topic guide for the interviews with medical doctors and the key informant interview. 3 medical doctors planned an interview, but only 1 was conducted due to problems with connectivity, electricity, technical problems and availability of the participant. Since there was little response on the in-depth interviews and saturation was not met, the interview will be analyzed as key informant interview.

A topic guide was only composed as a guide when there was too much deviation of the subject of exploring motivation to work during the COVID-19 pandemic. There were 3 factors added to the topic guide after reviewing the electronic survey:

- Remuneration
- The possibility for personal growth during the COVID-19 pandemic
- Their impression of the burden by non-specialist medical doctors at work or the work strain due to COVID-19

From the 16 participants that agreed on the electronic survey, 10 participants had left their email address and received an email with the request to suggest a date and time for an interview. The participant with the outlier on high self-determination was approached separately, but unfortunately there were connectivity and electricity problems and therefore the interview was never planned.

Data processing

For the interviews, a verbal consent was requested for the recording. Recordings were stored in a folder with a password on the researcher's computer. The recordings will be kept for five years. Transcriptions were saved in word files in the same folder. Pseudonyms were used during transcription of interviews and confidentiality and privacy will be secured. They were saved anonymous and stored safely in a folder with a password on the researcher's computer. All transcripts were coded in excel for the motivational factors.

Analysis of results for key informant interviews

All transcripts were coded for the factors related to the questions validated by Temblay (2009) motivation to work, organizational support, remuneration and the extra factor added COVID-19-related. The coding was done both deductive and inductive. Box 2. shows adaptations for the factors that were retrieved through induction and deduction.

Factor	**Adaptation**
Motivation to work	Maintained
Organizational support	Maintained
COVID-19	Due to the entanglement of COVID-19 to all motivational factors, it was not possible to describe the impact of COVID-19 on itself on the motivation to work.
Mental health impact on motivation to work	A lot of emphasis in all interviews on the mental health support needs related to the motivation to work through induction. Therefor mental health support was noted as specific factor for motivation to work.
Continuation of care and health equity	Literature search showed the importance of continuation of care in times of COVID-19. Therefore, continuation of care and equity was added as factor.
Work strain and shortage of staff	Was retrieved through deduction as well. This would be part of organizational support and management, but due to the large attribution to health work force shortage during COVID-19, this was added as specific factor.
Supervision and personal growth	Supervision and personal growth were added because of the answer to the electronic survey and the emphasis in the interviews.
Remuneration	Added as factor after reviewing the survey secondary to the answers to the open suggestion box.

Box 3. Factors and adaptations done for analysis of key informant interview by induction and deduction.

Limitations

Expected limitations of the methodology are visible in Box 4. Most limitations are a result of the distance-based recruitment, small sample size and connectivity of participants.

Expected limitation	Anticipation
The small sample size and the risk for low response rate	Reaching out to the study population through their superiors will follow the hierarchal structure and will therefor reach all possible participants. For the GMOs and JRMOs with little access to a computer, the possibility of responding through WhatsApp link in a group message was made available.
Self-reports and possible social desirability	There is strong emphasis on anonymity. Because the survey is about internal and external motivation, this should not be an issue when we emphasize the anonymity.
Connectivity with the participants	For the survey, they need access to data bundles and for the interview as well. There are no funds available for this and it will be from their own budget, which might limit possibilities. Attempts will be made to see if a hospital computer is available or hospital Wi-Fi to be accessed for the in-depth interviews with the participants.
The representability of medical doctors' motivation to work during the COVID-19 pandemic to the entire medical doctor population of the country	This entire group of medical doctors in Zimbabwe is very heterogenous as for exposure to COVID-19 patients, due to the various specializations and for access to other means to earn extra salary. Therefor this study population includes only non-specialist medical doctors or medical doctors in training to become a specialist to maintain relative homogeneity in the group of medical doctors. These non-specialist medical doctors will still be relatively comparable in their exposure to patients with possible COVID-19. The choice for Midlands Province Zimbabwe is due to special interest for this province by the researcher in this geographical area and the size of the data sampling for one researcher.
The representability for the motivation to work without COVID-19	This research is on COVID-19 and the motivation to work. There is no possibility to generalize this to the general situation in Zimbabwe, since there is a large impact of COVID-19 on the content of the interviews. Even though some factors might have been long standing, there is no comparison with the same questionnaire before or after COVID-19.
Remuneration component as motivational factor	Due to the current economic situation in Zimbabwe, there might be little transparency on salaries, extra incentives, and possible illegal practices. There are a lot of different expressions for financial compensation or addition on top of the government salary, that will be unclear to mention in the survey, like top-ups, incentives, private enterprises, locum, etc. Therefor this would be research on its own to calculate the degree of remuneration needed and other benefits that could compensate for loss of remuneration.
Opening up to a female interviewer	There was no possibility to avoid this since there was only 1 researcher conducting the interviews.
Opening up to a foreign researcher	There was no possibility to avoid this since there was only 1 researcher conducting the interviews. This could be an advantage as well since there would be no conflict of interest.
The survey and the interview showing the need for coaching	During the survey and interviews, participants might realize they need counselling. There are psychologists at Gweru Provincial Hospital who will be available through the PMD for counselling. Apart from this, Inuka Coaching has been contacted by the researcher and they are open to meet with participants who express the need. This was included in the introduction and consent form. Through Inuka, participants can get free online coaching or meet a coach in Zimbabwe. Or a limitation opening to a foreign interviewer, but this might also be a benefit.
Medical doctors using this research as platform to 'complain', while this research is about the motivation to work and not about all the issues that are ongoing.	There will be a strong need to channel this frustration in the interview and focus on the motivational components. The topic guide will offer questions when dialogue deviates from the subject of motivation and the factors addressing motivation to work.

Box 4. Expected limitations and anticipation in this research on Motivation to Work during the COVID-19 Pandemic.

STUDY FINDINGS AND RESULTS

Results literature study

Push factors and Pull factors during the COVID-19 pandemic

Literature study on *Push*, *Pull*, *Stick* and *Stay* factors are not available on the Zimbabwean medical doctors during COVID-19. There are multiple sources clarifying the *Push* factors during the COVID-19 pandemic, of which some are longstanding factors. In 2017 10 000 adult Zimbabweans were interviewed and 47 percent said they had considered emigrating with most important reasons being finding a job, economic hardship and poverty.[52] The World Migration Report 2022, shows that sending remittances home, especially in Sub-Saharan Africa, is expensive, but COVID-19 might push technology to improve and reduce the costs. Zimbabwe is the top 20 of receiving international remittance with a large diaspora.[53] The COVID-19 pandemic mobilized diaspora as well to create platforms and share knowledge. Facebook pages were people could join for information on the corona virus and sharing online meetings on mental health, Ministry of Health and Child Care (MoHCC) updates, interviews and sharing information on the coronavirus.[54] Most of these groups and meetings mainly started to counter the parallel pandemic on misinformation and infodemics.[55] During the COVID-19 pandemic, the work force challenges increased due to the continuous migration of HCW secondary to the socioeconomic circumstances.[40] Lack of insurance, social security, employment and the collapsed economy pushed many HCW into leaving for greener pastures.[40] Many developing countries experienced an increase of the already standing problem of the brain drain of medical staff. Countries like the United Kingdom launched the possibility to fast-track Health and Care Visa for HCW. It is unclear what the impact to the health care system for Zimbabwe is going to be, since it is a country with one of the highest emigration rates of native-born medical doctors (figure 7).[56] [57] Visa extensions were granted easier and high income countries are filling up their gap in the health work force and it remains unclear what will happen with these visas after the COVID-19 pandemic.[58] Recruitment, work authorization and easier access were all granted in a response to the COVID-19 pandemic, which are major pulling factors.[57]

The health systems of both source and destination countries should derive benefits from the international migration of health personnel. Destination countries are encouraged to collaborate with source countries to sustain and promote health human resource development and training as appropriate. Member States should discourage active recruitment of health personnel from developing countries facing critical shortages of health workers.

(*Citation Article 5.1 of the WHO Global Code of Practice on the International Recruitment of Health Personnel*)[59]

Article 5 of the WHO Global Code of Practice on the International Recruitment of Health Personnel covers the health work force development and health systems sustainability. The code continues with offering suggestions for bilateral arrangements to promote adoption of measures, like support for health work force retention, support in education and training and support of return migration.[59]

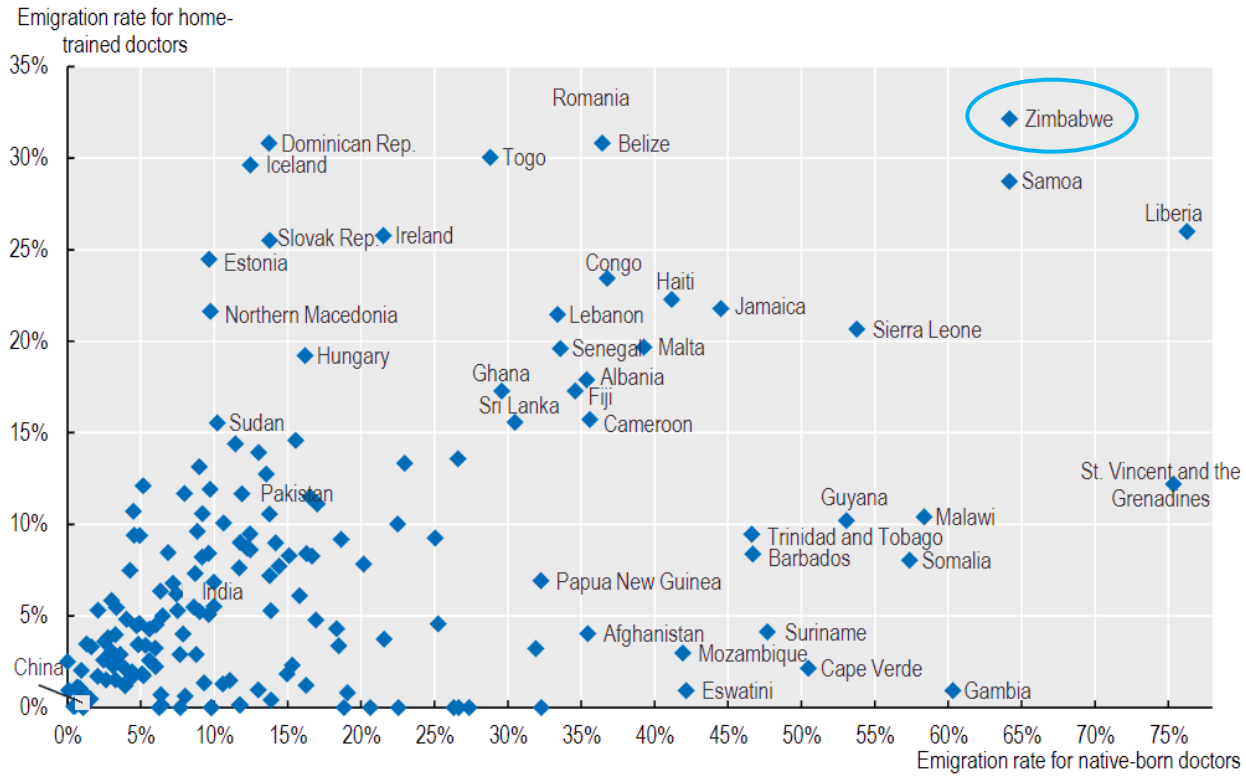


Figure 7. Adapted from OECD Health statistics 2019. Top 25 emigration rates for native-born or home-trained medical doctors. From Zimbabwe, almost 65 percent of their native-born doctors are emigrating. Data for native-born doctors is from 2015/2016, from home-trained doctors from 2017/2018.[57]

The percentage for non-UK National Health Service (NHS) staff of African origin grew from 1.9% in 2016 to 2.5% in March 2021. As per March 2021, 4,780 HCW were of Zimbabwean origin in the NHS. 3% of the nurses were of African nationality of these 58% of the African nurses were either Zimbabwean or Nigerian. The origin for medical doctors are little for the Zimbabwean origin, but 4.9% of the General Practitioners qualified in Africa.[60] A high percentage of the medical doctors in the UK and in the USA are foreign trained and recruiting foreign HCW will only strain the health care systems in the low income countries more.[61] The emigration rate for native-born doctors from Zimbabwe is 64 percent in 2015/2016.[57] [62] The estimation is that the number of medical health staff leaving the country during the COVID-19 pandemic in 2021 compared to 2020 is double the number and three times the number of doctors, nurses and pharmacists that left in 2019 mainly due to remuneration.[63]

Post-COVID-era

Shortages of HCW, especially in low-and-middle-income countries, are associated with problems in work force migration and maldistribution, imbalances in training and skills, poor management and supervision and reduced performance and productivity.[19] The health work force is also a big employer for women with the possibility to improve women empowerment and gender equality.[22] In Zimbabwe, the higher positions for nurses are mainly taken by men. Access to training were more based on seniority and years in service.[6465]

The post-COVID-era will show difficulties. If pre-COVID, the system is already pushing staff away because remunerations, but also frustrations about challenges with equipment, supplies and transport, there will be difficulties due the change from current public health programs to COVID. HCW were reassigned from their duties to meet COVID-19 demands. Limited funds from international donors and aggressive COVID-19 campaigns may result in an increased morbidity and mortality of HIV and TB.[66] This same trend is expected in the elimination of malaria. During the pandemic an increase in malaria cases was seen.[67] The new pressure to scale up pre-COVID-19 programs in a HCW population that has little motivation might strain the system even more. The COVID-19 pandemic challenges all health care systems, but the burden becomes even more inequal as pre-COVID-19 if the brain drain is not resulting in a brain gain for low-and-middle income countries like Zimbabwe again.[68]

There is a lot of attention for decolonizing strategies and financial independence, but in some situations overseas assistance to create more fiscal space is necessary to allow governance strengthening, retention of health staff and motivation for performance, quality improvement and provide adequate supplies, like during the COVID-19 pandemic.[12] The influx of funds due to the COVID-19 pandemic have been invested in the

renovations of hospitals and wards to improve the health care system, but need to be maintained. The funds for the COVID-19 pandemic are temporarily which means that for maintenance of these improvements will still take extra effort in the future (Figure 8a and b).

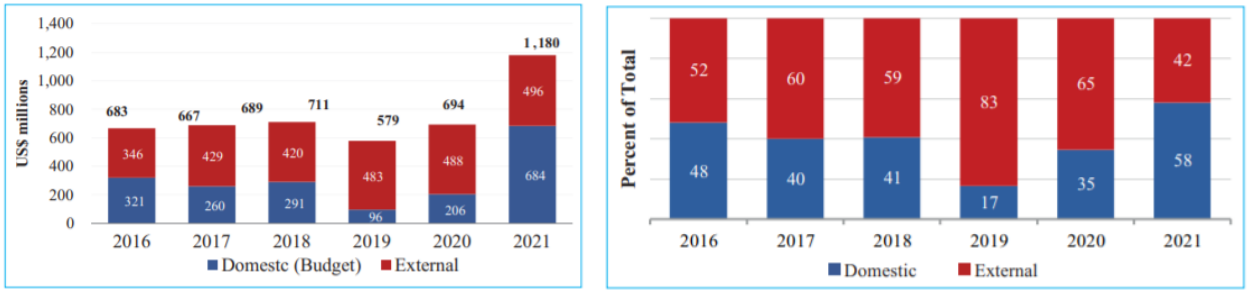


Figure 8a and 8b. 8a sources of health sector financing, 2016 - 2021, in US$ millions. Domestic resources showed decreasing trend up to 2019, but were rising in 2020 again. Stability of the Zimbabwean dollar, previously bond note, will be crucial when calculated to US dollars. The external resource remained stable. 8b. Composition in percentage of total of health financing 2016 - 2021. Showing an increase in domestic expenditure. [17]

The UNICEF health budget brief Zimbabwe states this as one of the key takeaways. They emphasize that without a well-capacitated and motivated health care workforce, all other investments into the health sector will be put to waste.[17] Health care infrastructure needs improvements, but capital budget to the Ministry of Health and Child Care (MoHCC) was cut from 31 percent in 2020 to 17 percent in 2021 making is very difficult to invest and improve infrastructure (Figure 9).[17]

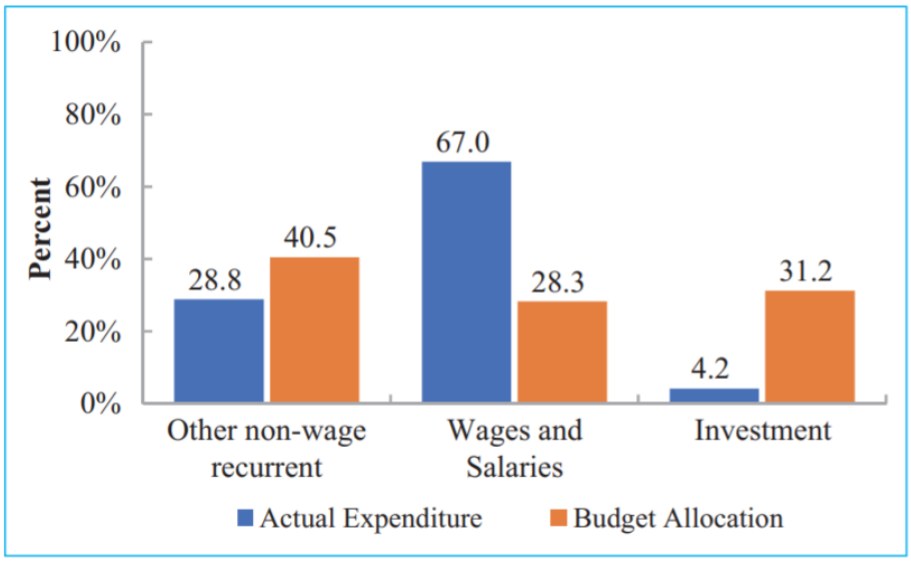


Figure 9. During the COVID-19 pandemic in 2020, MoHCC spend 328 percent more on wages and salaries in health and much less on investments.[17]

When financial incentives for health workers in Zimbabwe is difficult to realize in the current economic situation, it might be possible to address the other factors that motivate medical doctors. To deliver quality care HCW must be empowered and motivated. The occupational health and safety is an important component of employment conditions. Occupational health, remuneration and non-financial incentives promote motivation to deliver adequate and high-quality care. To improve health workers motivation, equitable distribution and retention, job satisfaction and performance several possibilities are mentioned by the Workforce 2030 paper from the World Health Organization. Some of the possibilities mentioned include changing workload, career development, hardship allowances, family incentives and housing allowances. [12] [65] Fatal flows were already mentioned in this introduction when the brain drain continues.[8] The WHO Global Code of Practice on international recruitment of health personnel in 2010 was an important strategic development and would have to be used as resolution for the extravagating problem that will increase due to the COVID workforce migration.[14] There are strong debates on decolonizing global health stating that it is still mostly coming from one side; the high income countries releasing their obligation to fund a low or middle income country. The commitment has to come from the low- and-middle-income countries as well, they have to be included in order to develop and retain a skilled workforce.[69] Africa Centers for Disease

Control and Prevention is trying to attract HCW back form the diaspora by creating package of measures through the African Union commission to support the expatriates to facilitate their return.[70]

Quantitative results

The quantitative analysis will start with the motivational statements derived from the self-determination theory and then continue with the statistical analysis of the COVID-19 related questions.

Population and generalizability

If the anticipated sample was reached with forwarded email invitations, the response rate of this electronic survey is 23 percent (16/70). Since there was a small sample population only (N=16), there was no possibility in calculating the overall motivation to work, but the W-SDI could reflect the self-determination and implications to the low or high W-SDI score. There are no generalizability analyses possible on motivation to work or the impact of COVID-19. Demographic data of the sample population is summarized in Table 1.

Table 1. demographic data of the sample population. The characteristics do not include the difference between urban and rural since the district (N=5) could be both rural and urban. This characteristic applies to the working position as well, a governmental medical officer (N=11 + medical superintendent) can work urban and rural, as well as the DMOs.

Variable	Number of participants (N)	Percent of total (%)
Gender		
▪ Male	12	75
▪ Female	4	25
Age		
• 20-24	0	0
• 25-29	8	50
• 30-34	2	12.5
• 35-39	4	25
• >40	2	12.5
Work experience		
▪ 0-2 years	5	31.25
▪ 3-5 years	3	18.75
▪ 5-10 years	3	18.75
▪ >10 years	5	31.25
Workplace		
▪ Provincial	7	43.75
▪ District	5	31.25
▪ Semi public	4	25
▪ Private	0	0
Current position		
• Public provincial hospital	7	43.75
• District hospital	5	31.25
• Semipublic hospital	4	25.00
• Private hospital	0	0
Other (please specify)	0	0
Working as		
• JRMO	1	6.25
• SRMO	0	0
• GMO	11	68.75
• DMO	3	18.75
• Medical superintendent	1	6.25
• Other (please specify)	0	0

Analysis of the motivational statements derived from the SDT

16 participants responded to all statements in the survey. There were no missing answers on the motivational statements derived from the SDT. Figure 10 shows the statements and answers in box plot. There is a trend visible in the statement representing amotivation "in this job too much is expected of us". This means this has a largely negative impact on their motivation to work since all medical doctors would see their job as expecting too much by the time they completed the survey. The other trend that would be visible is the statement where they would state "I work in this job because it is a part of my life".

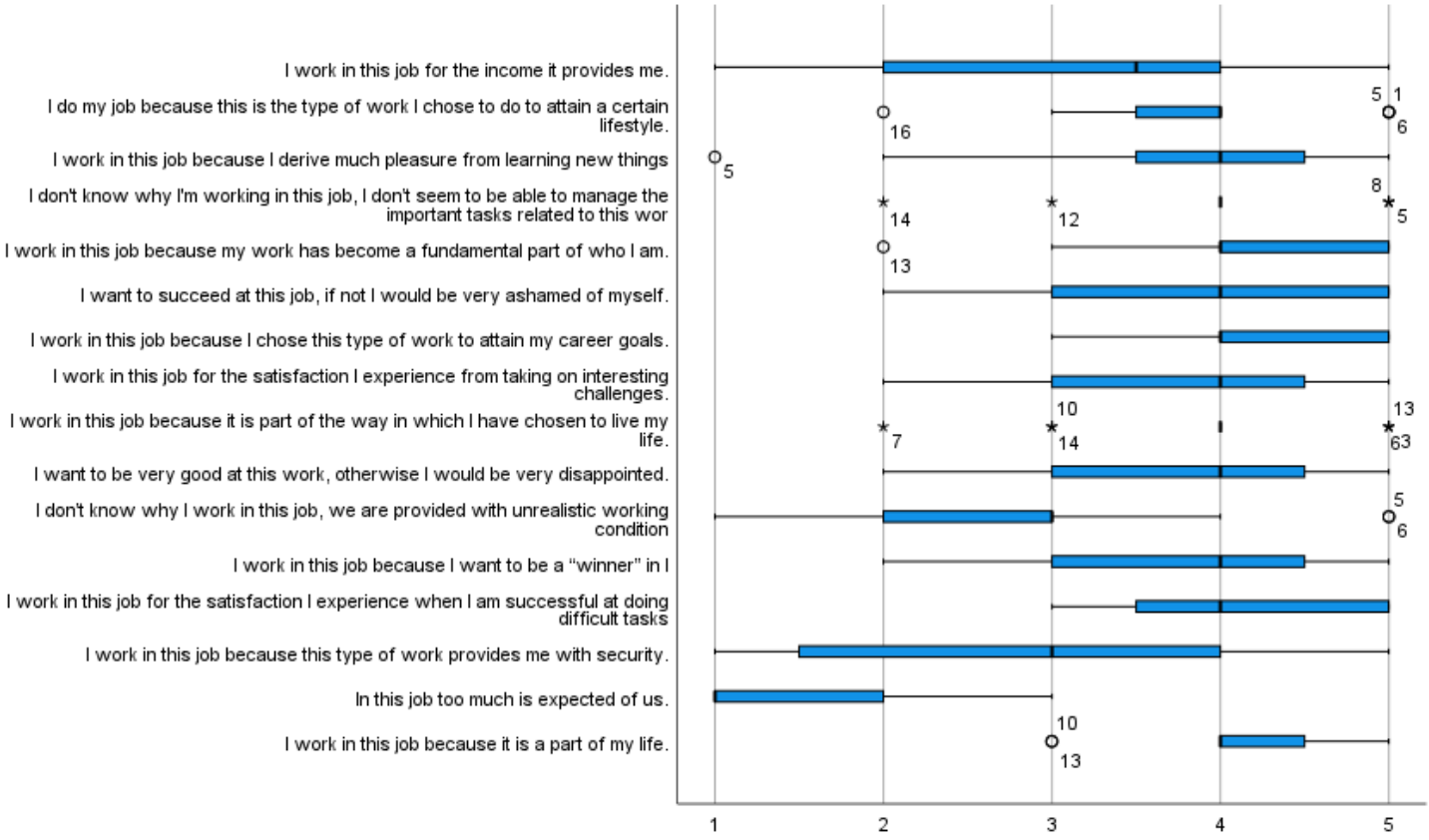


Figure 10. Statements from 1 (top) to 16 (bottom). Box plot showing mean (black dash), upper and lower quartile (end of the boxes), the minimum and maximum (end of the black line). Ranges are from 1 to 5 according to the Likert scale of 1 being decreased a lot to 5 representing improved a lot. Stars and dots are outliers with the number of the participant. Questions 4, 11 and 15 have been reversed since they represent revered amotivation statements.

P-values were calculated to measure correlation between the statements within a motivational factor. Several correlations were seen as represented in Figure 11.

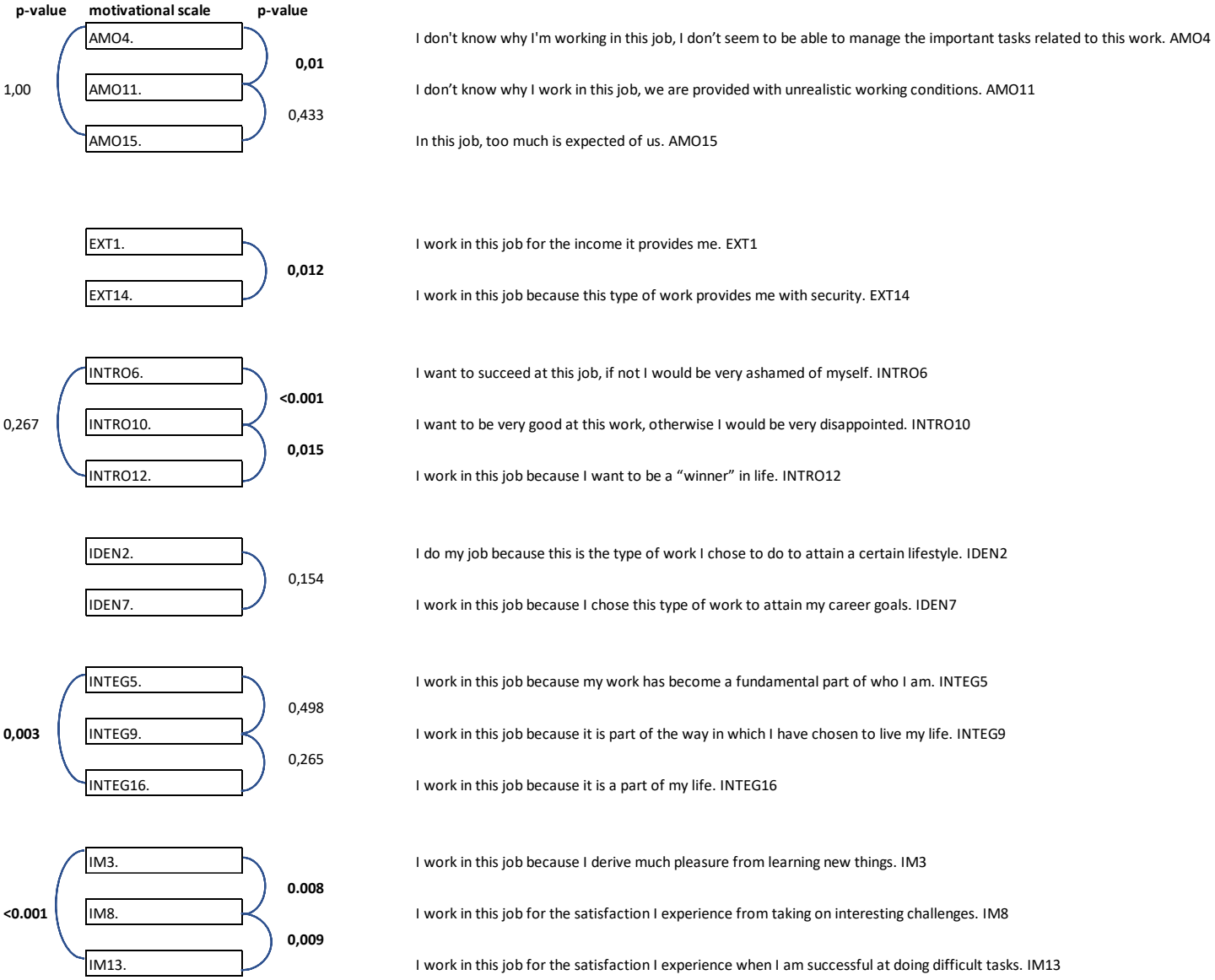
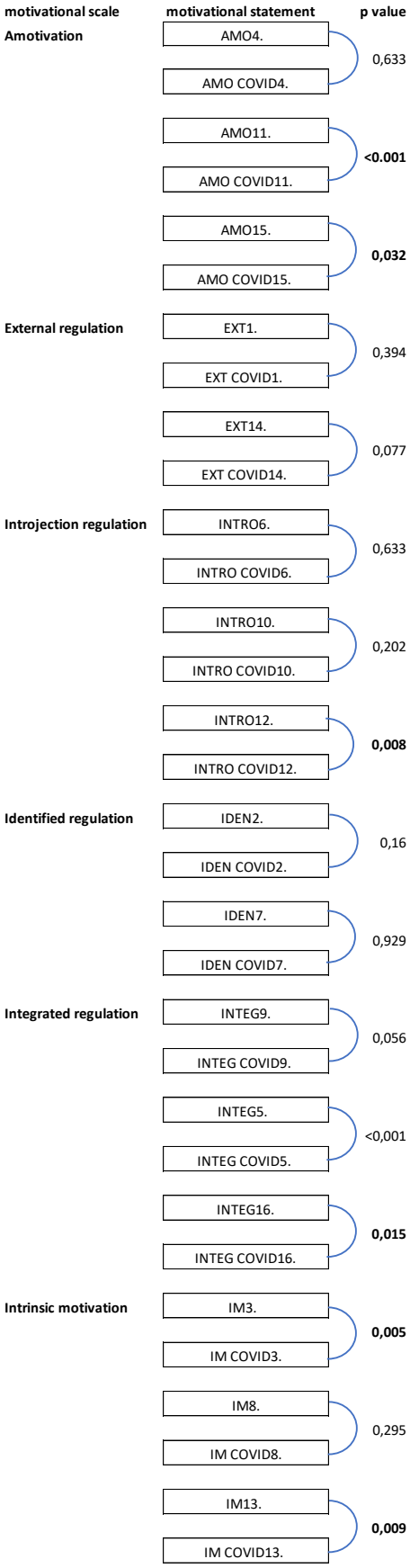


Figure 11. Motivational statement and correlation between statements. All statements correlated significantly within the intrinsic motivation scale. There was a significant correlation between statements within the integrated regulation (INTEG5 and INTEG 16), introjected regulation (INTRO6 and INTRO10 and INTRO10 and INTRO12), external regulation (EXT1 and EXT14) and amotivation (AMO4 and AMO11). Showing that there was no consensus of the group of the correlation of some of the statements within a motivational scale.

Analyzing the impact on motivation by COVID-19

Statements 4 and 16 had 1 missing answer, but all other questions were answered by 16 participants. There was a trend visible in the statement "with COVID-19, I learned new things", being on the positive side meaning that participants showed a positive effect on their motivation. The other statements that showed a trend was statement number 4, amotivational scale, "With COVID-19, the amount of managing important tasks related to this work" increased a lot, having a negative impact on their motivation (Box plot, figure 1, Annex 4).



The p-value was calculated to find correlations between the motivational statement and the COVID-19 related statement. There were several correlations found. With COVID 19 the job expectation increasing and the statement that participants were provided with unrealistic working conditions and too much was expected of them in their job. But also, positive correlation with learning new things during the COVID-19 pandemic, their job being a fundamental part of them and wanting to be a 'winner' (Figure 12).

Figure 12. Motivational statement and correlation with the related COVID-19 question. There was a significant correlation between statements amotivation 11 and 15 in relation to their COVID question. Introjected regulation statement 12 was correlated with the COVID statement that they wanted to be a 'winner'. INTEG16 correlated with their job being a fundamental part of their lives. And intrinsic motivation statement 3 of learning new things during the COVID-19 pandemic.

Work self-determination index (W-SDI)
The work self-determination index was calculated (Box 3 for formula). Individual scores on the W-SDI were calculated through excel and the results can be found in Annex 4, table 2. Overall W-SDI was calculated for the group: 5.651 for the overall group. W-SDI correlations with gender, workplace, experience and position were not found, Pearsons chi square scores were not significant on correlating these factors. The maximum score on W-SDI was 24, on a 5-point Likert scale. W-SDI individual scores ranged from a score of 2.50 to 16.18 (Figure 13).

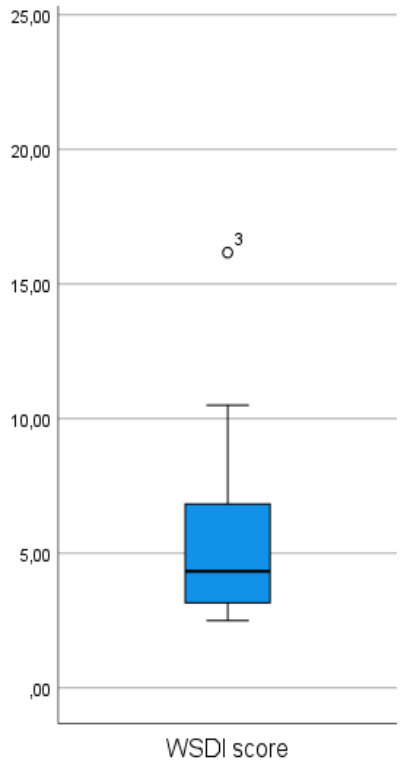


Figure 13. Work self-determination index ranging from 0 (minimum) to 24 (maximum). Box plot showing the mean (bold black line), upper and lower quartile (top and bottom box), the minimum and maximum scores (thin black line) and the outlier of 16.18.

Responses to the open questions in the electronic survey
The electronic survey ended with two open questions: "Did the COVID pandemic change your motivation to work? How?" and "Do you have any suggestions or remarks you would like to add?". Answers to this question were summarized in table 2. for the first question.

Table 2. Answers in the electronic to the open-ended questions. 15 out of 16 respondents left an answer to the open question. "*Did the COVID pandemic change your motivation to work? How?".*

Increased motivation	Similar motivation	Decreased motivation
The eagerness to safe life increased	Covid never had any impact on my motivation because many cases that I managed were mild cases. The disease pattern is predictable because the cases are usually high in winter. Also, the virus showed some leniency, unlike HIV, in the sense that it did not aggressively affect the juvenile globally and it wasn't marked by a vertical transmission from mother to child. In other words, it had some respect for the next generation, unlike HIV which has a potential of causing human extinction in the sense that it kills both vertically and horizontally.	I feared for my life and was not compensated for the risk I took up which could also affect my family, I couldn't visit my family as often as I wanted and when I fell sick with Covid, No-one cared for my health except my family, some people at work even wanted me to cover for my lost days, I applied for the compensation from government and it has not been paid. It's been months now. I end up asking myself if the risk is worth it

No it did not. I have always delved into situations where I believe I can make a difference despite there being a reward or risk.		At first it decreased my motivation. Seeing people die and putting myself at risk was no fun
positively	Remained the same	Expectations increased but remuneration did not, workload increased with inadequate personal protective equipment. Compensation for medical personnel that got infected with COVID was never received.
		Yes. Motivation levels went down. No PPE, low remuneration, staff shortage , high workloads, no equipment
		It decreased my motivation to work because I don't feel safe at work
		Yes, workload versus best benefits mismatch
		Yes. Motivation to work decreased so much
		Yes, decreased it.
		yes, decreased motivation
		Yes, too much workload

The answers to the second question "Do you have any suggestions or remarks you would like to add?" were summarized below. 8 participants left a suggestion or remark after the questionnaire and these covered demotivation and suggestions for improvement. The suggestions could be summarized in the areas that are addressed in the interviews as well: remuneration, organizational support, mental health support and shortage of staff during the COVID-19 pandemic. The factor most emphasized is still remuneration.

- Knowledge about COVID and the risk factors and therefor specific public health focus
- Need for vaccination and its impact on those at risk
- Improve providing correct scientific information
- Improve financial remuneration of HCW
- Need for improved living conditions for medical doctors deriving from poor remuneration and limited allowances
- Need for compulsory psychological support
- Inadequate provision of PPE
- Improve testing possibilities for HCW
- Inadequate staffing of covid wards
- forced mandatory vaccination of health care providers are some of the reasons which decreased motivation to work
- Stop empty promises from the government for insurance for those contracting COVID on duty

"COVID really impacted on HCW."

Qualitative results

3 key informant interviews were conducted. Since only one in-depth interview was conducted and saturation was not met, the in-depth interview served as a fourth key informant interview. The result of these interviews will be combined to summarize the factors and responses to address the motivation to work by HCW, specifically non-specialist medical doctors.

Motivation to work

In all interviews, motivation to work was specifically asked for and asked to clarify what their impression was on the impact of the COVID-19 pandemic. The questions covered both their own motivation to do their work and their impression of the motivation to work by non-specialist medical doctors and their impression of their possibility to influence that motivation. All interviewees mentioned that there were certain factors that already had a negative effect on the motivation to work by the medical doctor's workforce before COVID, like remuneration and the economic situation of the country. They verbalized that there was still a drive from medical doctors to help patients and help their community. Key informants described that as the humanity aspect and their commitment to help. At the start of COVID, demotivation to work was mainly driven by the anxiety to work and the focus on lack of personal protective equipment (PPE), but all interviews progressed into the positive effect on motivation that came with team effort, experience with COVID cases that gave more confidence in the use of infection prevention, treatment possibilities and control methods.

The reason medical doctors were still working were explained as "*This is where we are working. This is how our life is.*" "*We still have to move on it and work.*" (KI-4), but on the other side there was the clear

statement that work was "*frustrating*" because of "*a lot of uncertainties*". "*the morbidity was high*", "*you see people dying in casualty*", "*there is nothing you can do*" (KI-4). The loss of morale, in the beginning of the outbreak, of medical doctors was explained as the despair that comes with the inability to help and the little knowledge that was there about the new virus. But there was also an element of desire to help, obligation to work and the drive to help others and encourage each other. This was a motivator to all.
Then another motivational factor that came with the missing knowledge on the virus, was the anxiety about contracting the virus and passing it on to relatives. With management protocols, doffing and donning trainings and more education, all interviewers stated that there were less issues with motivation. Medical doctors, who have treated more COVID cases, got their confidence and knew what to do. KI-3 emphasized that they made sure they celebrated successes and that some of the COVID cases were *"blessings in disguise"* since they were used as example to show that there was little transmission of COVID from the patient to the attending HCW. There was little understanding of COVID in the beginning, therefor cases were needed to gain more confidence in support and treatment of both patients and HCW.
The COVID-19 pandemic had positive effect on motivation of the key informants themselves when they were able to see what they had been able to realize up to now, what they learned and experienced to fight this and possible next pandemics. The COVID-19 pandemic had a negative effect on their motivation when they were going through previous months in their mind when they sometimes had to decide to close wards or departments due to shortage of staff.
In the interviews, it was clear that the psychologic factors anxiety and insecurity, which came at the beginning of the COVID-19 pandemic, were of big influence for the motivation to work. KI-3 stated that there was special attention for the mental health needs of the health workers already from the start, in their hospital. They formed steering committees to address all upcoming issues like infection, prevention and control (IPC), procurement and mental health support. The steering committee of mental health support, including clinical psychologist and the psychiatrist, engaged with the health workforce from the beginning.

"To put it in the words of one of the psychologists, he was relating to us that some of the nurses who participated, their colleges were telling them that they are left with 7 days to live before they die of COVID."(KI-3)	*"This is where we are working. This is how our life is. We still have to move on it and work. You are encouraging each other to say no this is what we have to do. We need to help people, bring management to issues to whoever comes in. That should give you the energy to work."(KI-4)*	*"I think realizing that people can be managed, can go home, had some positive effect on the motivation of health care workers."(KI-2)*

Mental health impact on motivation to work
All key informants mentioned mental health support. KI-4 did not experience specific problems themselves but could tell examples of colleagues who needed mental health support. Anxiety and work strain were the most crucial factors for the need of mental health support. The insecurity of a patient coming and not knowing if that patient would have COVID was mentioned by all key informants. Key informants emphasized the need of motivating each other and motivating themselves. KI-3 stated that team leaders had to step up and lead from the front, there was no room for anxiety by management. They had to encourage themselves, their colleagues and their team. All participants expressed that there were difficulties to stay motivated to work with the anxiety on the work floor. Participants expressed their own anxiety in dealing with possible COVID patients and dealing with the anxiety of the other HCW. KI-4 called it traumatizing to have to go through the difficulty of encouraging the team and dealing with a supporting team that is not forthcoming, a rapid response team that is not responding and the need to call a superior. There was a lot of confusion.
In the KI-4 interview, there was quite some time spend on the anxiety to work and the stress that was caused by it. Going to work, not being sure if there would be personal protective equipment, not being able to tell if a patient had COVID since testing was not always available. But the focus of the anxiety was on the part after leaving the environment of the hospital. The anxiety that came with the uncertainty if something had gone wrong with the infection prevention control measures and the risk to pass the virus to a relative. The support system at home was a major demotivational factor since the anxiety to spread it to your relatives and your vulnerable elderly made working worrisome. KI-4 mentioned the stigma that he felt, being treated by relatives as high risk of infecting them with COVID-19. There was chronic pressure and chronic stress coming with the anxiety, especially in the beginning.
Key informants mentioned the responsibility that they had during the COVID-19 pandemic. All key informants stated they were still motivated to do their own job, but they could see the mental health issues with their HCW. Another subject that key informants mention is 'pandemic fatigue'. KI-1 would hear and see their colleagues and fellow HCW having trouble to motivate themselves to continue to work since the COVID-19 pandemic is too long and too much stress. The work strain being too much for too long.

Over time there have been initiatives to address the mental health of HCW. One of the key informants verbalized that the psychiatrist and clinical psychologists were included in a very early stage to address anxiety and motivation to work. Those group and individual counselling sessions supported most of the medical doctors on the COVID ward. Another key informant explained that they are rolling out a mental health program for their HCW now using questionnaires to regularly review the psychological state to be able to support them, but this had just been starting.

if you don't get results, you don't deliver what's supposed to be delivering. obviously that would come as you would be depressed, anxiety and all that. That comes to depression at work."(KI-4)	*"It was scary for most of our staff. Staff didn't know what to expect, they were actually scared to deal with patients or with suspected COVID. So we really had to think of different ways to try and make people learn, try and encourage them." (KI-3)*	"Even though, after that you say this stigma that comes around to say you interacted with someone with covid. Can you go back home? To… to your relatives. Go to where your family is? You're in a dilemma."(KI-4)

Organizational support

Organizational support was explained as support from someone in the management system that would make sure arrangements were there, but also teamwork and recognition or appreciation was shown. The key informants were specifically asked about how they would motivate their staff. All key informants verbalized that they tried to motivate their staff by showing support and complimenting them on their work. KI-3 expressed that they would be an example, a leader, who supports in all ways and they would be available at all times.

During the KI-4 interview it became clear that from the medical doctor's perspective it was most important to have the resources, the consumables, the equipment. This point was also mentioned before in motivation to work and mental health support. The motivation to work during the COVID-19 pandemic derived from the safety that was experienced when infection, prevention and control was secured. The need for a supporting system was also expressed by KI-4. The demotivational aspect of the unavailability of equipment, materials and consumables was devastating for the frontline workers since the shortage was very visible for them. Inadequate PPE and difficulties with isolation facilities made it difficult to work.

For KI-4 it was important to get help when needed. Other key informants also expressed that they tried to improve motivation by showing their gratitude and their appreciation of the efforts of the front-line staff. They emphasized the importance of acting together in the crisis of the COVID-19 pandemic and therefor it is appreciated if higher levels show support and respond to teamwork is needed.

During the COVID-19 pandemic, HCW needed the possibility to feel protected. The feeling of protection improved with improvement in procurement, renovations and the creation of space (KI-1, KI-2, KI-3). With the COVID-19 pandemic funds became available to renovate institutions. KI-1 and KI-2 referred to government funds, but KI-3 also explained that they would be proactive and look for donations to boost the preparedness for the COVID-19 pandemic. Disbursements were made, according to the key informants, but it takes time to improve the preparedness of the facilities with renovations when there was still of lot of outstanding maintenance to be done.

Organizational support comes from all levels, especially in a crisis like the COVID-19 pandemic. Most key informant interviews discussed of their superiors, but during the COVID-19 crisis this support will be needed from patients and colleagues as well. Apart from funds, recognition from national level is needed when there are successes at local level. With empowerment of some of the specialists, KI-3 also experienced the cooperation going well with participatory leadership, leading to a more motivated and much less resistant team.

"You end up calling the medical Superintendent and they come and then they assist you." (KI-4)	*"The experience that we had, there was recognition at national level. I think that helps, that recognition helps to motivate the health care workers to continue to help more people."(KI-3)*	*"Yeah some of the patients who would see it as they can't help, some of them discuss with you on the sideline that we understand you guys. And they sympathize with you." (KI-4)*

Continuation of care and health equity

The continuation of care during the COVID-19 pandemic was a global issue, but this is an important subject when health equity is already compromised in a health system under pressure of shortages. Key informants all emphasized that, especially at the start of the COVID-19 pandemic, due to anxiety and due to lockdown

measures the continuation of care was interrupted. With increasing numbers of HCW being tested positive, facilities had to be closed. Sometimes, it meant closing a department or ward, but sometimes it meant closing an entire hospital, depending on the size of the outbreak. Key informants stated that that would also have effect on their feeling. It did not mean they became demotivated, but they stated that it was a difficult position to be in and they experienced pressure from different sides, from the Ministry of Health to family members of patient.
The unequal distribution of health services becomes difficult as the health system was already fragile and strained. Access to care was even more difficult during the COVID-19 pandemic due to lock downs, restrictions and work force anxiety with strict regulations on COVID prevention. Unavailability of access to testing made it difficult to provide clear statistics on the size of the COVID-19 pandemic in Zimbabwe. KI-4 also stated that for the motivation to work, it was previously already difficult to deal with the delays in patients reaching the hospital, with the health care system and the availability of the ambulance to transfer the patients. As they said, it was already an existing problem, but because of the severity of the conditions and the number of severely ill patients due to COVID, this problem was magnified and had a negative impact on their motivation to work.

"So this issue about the HCWs, being too few and also being demotivated, just worsens the whole situation and it compromises our ability to provide equality essential services to the population." (KI-1)	*"We found that there was an increasing in mortality cases during the first two months of the pandemic almost doubled when you compare to the previous year 2019 with 2020 for malaria and for maternal death."(KI-2)*	*"It's a very difficult position to be in. Some people do understand, others don't understand. It can become sensationalized. When you are sick, you are sick. You want to be treated. That's just the issue."(KI-1)*

Work strain and shortage of staff
In the electronic survey, the question too much is expected from us score high as well as the following question "with COVID, job expectations for me" increased a lot. When asking this question to KI-4, there was not a clear response. For them, this question is obvious. Yes, there was too much expected of them since they were at the front line, being exposed. But on the other side, they explained that most of the stress and anxiety was at the beginning, due to the lack of knowledge about the virus and shortage of PPE. KI-3 stated that procurement has become much easier. KI-1 also verbalized that access to surgical masks is much easier now that it was before the COVID-19 pandemic.
KI-4 explained that the work strain and burn-out were especially in the work force that was always on duty on the COVID ward. Other staff, like KI-4, was mostly on duty according to a call schedule, which meant they were 'in and out'. During the fourth wave with the omicron variant, much more HCW were infected with COVID.
Key informants also stated that the major factor for the work strain was the continuous stress from the COVID-19 pandemic. The work force was under continuous pressure of possibly being understaffed.
KI-1 also verbalized that they really feel the brain drain increasing. With the increase of access to internet and the expansion of online possibilities, especially within urban and peri-urban settings, HCW get information on vacancies faster and the news about greener pastures travels faster.

"The numbers health workers that have tested positive for COVID 19 in the last month alone, for Midlands, moved from 400 to 947 within just one month when the omicron variant came and the fourth wave started."(KI-1)	*"Mostly, I think, it is the COVID pandemic. Because there is a lot of stress coming from overworking, lot of burnout. So there is a lot of burnout. And also when they get home, you get infected. Those blaming yourself. You are the one bringing the virus home as well. (KI-2)*	*"Our manning level right now have gone below 40% really and they keep signing people out that have just suddenly resigned, they have picked their bags and have left, especially nurses and doctors. So it's a big problem."(KI-1)*

Supervision and personal growth
KI-3 explained that they created a clear schedule of juniors learning from the seniors on the COVID departments. KI-4 confirmed that, verbalizing that they learned a lot from this new virus and all management protocols that had to be developed over time, being where they are now; comfortable in treating COVID cases.
With participatory management, they wanted to make sure that everyone felt comfortable working with a new disease, strict IPC protocols and more advanced machines equipped the high care unit. With improved facilities, high care units being functional, there are expectations from the key informants that this will attract more specialist doctors as well and with that, also medical doctors in training.

Learning possibilities increased also in other medical fields. With the COVID-19 pandemic, there was also an increase in online meetings. KI-2 emphasized that before COVID, access to meeting was more difficult since everything was face-to-face, meaning more time spend on travelling and accommodation. With the COVID-19 pandemic, there was more access to open zoom platforms, meet platforms and all other platforms. When asking about the learning possibilities for rural medical doctors KI-2 stated that the urban doctor will be better trained to use the equipment and the complicated cases than the rural medical doctor. Since there was no rural doctor willing to do an in-depth interview also due to access and connectivity, there is no possibility of drawing results from this.

> *"We actually applied, well applied like I said initially. This is a new condition that is coming. And there are a lot of things that we need to see or to experience, that we have to learn right from the start."(KI-4)*

> *"We didn't have such big ICUs in provinces. So those kinds of developments will attract more human resources in terms of specialists. So these are opportunities that corona brought about." (KI-2)*

Remuneration

Remuneration was pointed out a lot in the electronic survey and all key informant interviews. All interviews stated remuneration in the first ten minutes when talking about motivation to work.

Remuneration is a longstanding issue. KI-1 verbalized that *"The disgruntlement is about the working conditions and the remunerations and it is cross cutting in the rural and urban areas."* It is an issue for the government. All key informants stated that remuneration was not in their circle of influence except for advocacy. They emphasized that they would mention it as much as possible when meeting other top management staff. In the case of COVID-19, they refer to the risk allowance. KI-4 stated that the risk allowance, in their eyes, would have been a major motivator, but they were disappointed by the amount. *They are not just going in there for the money, but I think it gives that urge that motivation." (KI-4)* The government added a monthly COVID allowance, a compensation when they get infected and a compensation for their family when a HCW would die from COVID. There are several issues deriving from that allowance, as explained by KI-4.

1. With the eroded salaries they were expecting the risk allowance to compensate that. It did not.
2. Risk allowances were expected to be higher since they experienced a huge risk with their anxiety.
3. A division was created for the estimation of the amount of risk by making a difference between the Green (minor risk) and Red (considerable risk) zone. The impression from KI-4 was that without specific COVID symptoms someone would be considered minimal risk but could still have COVID.

When discussing the brain drain with KI-1, they explained that it was since there was not a clear change in working conditions and the remuneration, it is not the pushing factor that increased, but especially the pulling factor that became more obvious.

KI-3 also stated that they experienced HCW leaving, but much less than what they hear from other institutions. Earlier, the interview focussed on why there were no strikes at their institution and they emphasized that the same trend was seen with HCW leaving. Less HCW were signing out with KI-3 than other institutions. The reason that they stated was that next to the government remunerations, they offer other benefits to all HCW, depending on their position. Local incentives given to HCW at local institutions like accommodation or disbursement of rentals, lunches and tea at work, airtime, transport fees or fuel and connectivity.

> *"So already the moral was down because of salaries before the COVID pandemic. Remember our currency is weak. That COVID allowance would be in US dollars and converted to the Zim dollars, but they remained valid." (KI-2)*

> *"I think it wasn't handled properly. And that would affect demoralized people, the work force. The motivation goes down. I think that the allowances and even the salaries themselves were an effect to that including that mediates to the anxiety that patients would die."(KI-4)*

> *Indirectly, yes, COVID is the cause from that end, that the market out there has become more obvious during the pandemic and health care workers are finding a lucrative ground to go and work elsewhere instead of here, but really is because of our working conditions and our renumeration packages are not really that motivating for health workers to want to stay here."(KI-1)*

Framework analysis of motivational factors

A framework analysis was made of factors mentioned in a literature review, electronic survey and the interviews and integrated in the adapted Francos model of Will-do and Can-do by Maini et al. [20 28]

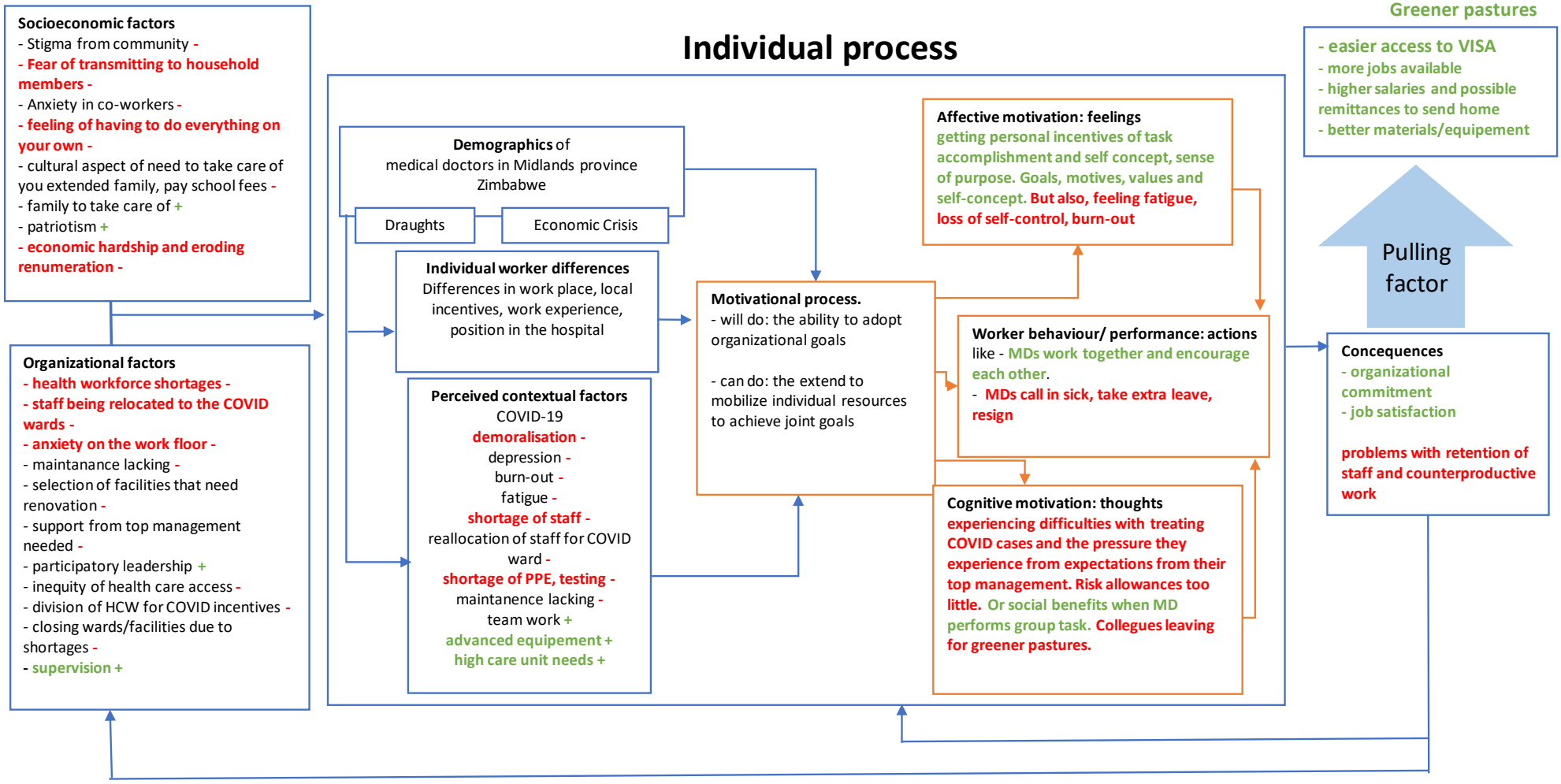


Figure 14. Framework analysis through the adapted model from Franco and Maini to visualise the outcomes of the literature study, survey and interviews to create a picture for the needs for retention and cyclic migration.
- demotivating factors, **+** motivating factors. In **bold green** important motivating factors and in **bold red** important demotivating factors.

DISCUSSION

This research has applied an existing model for self-determination and the ability to measure the motivation to work. This has been the first time being applied on medical doctors in Zimbabwe in the context of the COVID-19 pandemic. Assessing motivation is time bound and large sample sizes are needed to generalize results to all medical doctors in Zimbabwe, but this thesis shows opportunities for broad understanding of the motivational complex and possibilities for health system reforms to improve motivation to work. The model by Franco et al (2002) was designed to visualize the possibility for health sector reforms and their direct impact on organizational factors and the broader cultural and community context and indirectly on worker motivation, worker performance and worker experience or outcomes.[20] This is where results of this survey can be implemented to improve the motivation to work by medical doctors during the COVID-19 pandemic.

The Zimbabwean context of migration might differ during the COVID-19 pandemic from most literature presented on health care worker migration in 2006.[8] There are shortcomings in the health system that can be ignored or overlooked, but when globally a pandemic comes in, the problems will grow into proportions that will cause difficulties to fight the pandemic. These demerits are evident in a low- and middle-income country like Zimbabwe. Many OECD countries are aware of their recruitment of medical doctors to compensate for their own shortage in their health workforce.[57] High income countries have been fighting the constraints as HCW shortage, difficulties in procurement and unpreparedness for a pandemic like the COVID-19 pandemic and have therefor relaxed the visa restrictions for medical doctors. Apparently, the WHO Code of Practice on the International Recruitment of Health Personnel has not been considered by high income countries during the COVID-19 pandemic. Health inequity have become more obvious than before. This research focusses only on the motivation to work for medical doctors in Midlands province during the COVID-19 pandemic, but with the electronic survey and interviews emphasize longstanding issues with remuneration and a deteriorating health system in Zimbabwe. The literature study does acknowledge the growing problem of inequity extravagated by the COVID-19 pandemic in the perspective of human resources in health.

There are individual differences of the effectiveness of improving factors, therefore this research shows how effective mixed methods can be to get more understanding of the organizational structure that needs to be addressed. Figure 14 reflects the complexity of the individual process of motivation to work. Findings of this thesis include the confirmation of the difficulties in the consequences of this motivational process, medical doctors' retention. The average W-SDI of our participants was very low. 15 out of 16 participants scored below 12 points (minimum 0 and maximum 24). The lower the score the more indication of poor retention. Therefor there is need for more clarification on the motivation to work. The COVID-19 questions were not validated for the SDT-measurements. It will remain unclear what the effect of the COVID-19 pandemic is on the W-SDI of our participants. However, it might be possible to use the same formula on the COVID-19 questions and visualize if the COVID-19 pandemic had a positive or negative effect on the W-SDI. If using a factor of increase by dividing the scores using the same W-SDI formula for COVID, divided by the W-SDI result, 13 out of 16 might show an improvement of their W-SDI due to the COVID-19 pandemic (Annex 4 table 2). This will be interesting to clarify in a larger sample, supplemented again with more in-depth understanding through interviews. Findings show clear correlation between amotivational statements and COVID-19. Amotivation works strongest on the absolute negative side of motivation. Therefor there is need to address the aspects concerning workload, work expectations and unrealistic working conditions. The W-SDI can be used to address the participants that scored low and include them in management since literature shows that empowered leadership will stimulate these participants to improve their work. If it is not possible for the medical doctors to adopt the organizational goals, they might be able to achieve joint goals with more self-determination. As shown in Figure 14 the individual process of motivation to work is very complex and all different pillars should be addressed to effectively improve the motivation the work.

As we had a limited number of participants for the in-depth interviews, motivation to work as non-specialist medical doctor in Midlands province should be further explored. A larger sample size will be needed to find correlations with age, gender, social characteristics and work experience. For future interviews distance-based recruitment has shown to be less effective and face-to-face interviews might improve the response rate. There were contrasts in responses of participants of the survey and of the key informants. According to the key informant interviews, IPC measures were in place and there were no shortages of PPE or surgical masks anymore, but the responses by medical doctors on the electronic survey show otherwise. Does this mean there are inequalities in distribution? Or is there not a continuous availability? Or was this such a big issue, that even if PPE would be in place now, medical doctors still feel the chronic stress of the unavailability? To explain the differences between the answers to the survey and the interviews, larger sample size would be necessary.

Medical doctors have expressed their disappointment on the COVID-19 risk compensation since, that too, does not facilitate the salary that they need. The literature study of this thesis showed that the government of Zimbabwe is not able to pay the requested remuneration for the medical doctors, since they have been overspending their budget in the past two years and little has changed in the opinions of our sample population. When conducting the pilot study and discussing the statements with the pilot participants, it became clear that people remain secretive about remunerations. This would be interesting to investigate in the future; to calculate what medical doctors find reasonable to afford as medical doctor and what they feel they should earn when retracting local incentives like housing, airtime, fuel, internet and teas and lunches. Secondly, it would be interesting to find out why medical doctors in Zimbabwe are secretive about their remuneration, what they earn monthly adding locum jobs and top-ups. The COVID risk allowances were paid according to the risk that the HCW had to get infected with COVID. Being in the red zone, would increase your risk allowance, but it also created division within a team and extra disgruntlement since HCW became aware of what their risk was worth to others and in their eyes, it was far too little.

Despite the small sample size, this thesis showed a multispectral picture of the motivation to work and the rising issues due to the COVID-19 pandemic. There was a positive development explained by the key informant interviews. In the beginning of the pandemic there were shortages in PPE, test kits, drugs and even facilities; there was an anxious work force, there were isolation and quarantine units that had to be selected, COVID wards to be prepared, high care units to be prepared. The workforce improved management on COVID-19 cases, they knew what to do and the anxiety decreased with experience. The key informants presented it as structured preparation, but when comparing it to the content of what was mentioned by the medical doctor and the responses by the medical doctors in the survey, there were differences. As presented by most key informants, there was a hierarchal structure with top-down preparedness for COVID. In the open questions, there was a tendency to show demotivation, especially for the remuneration part. Especially the W-SDI of the sample group reflects possible problems in job satisfaction and organizational commitment and a high risk of resignation. The question here is, would participatory leadership and involving these non-specialist medical doctors in the preparedness for the COVID-19 pandemic, since they are the frontline workers, give them more sense of self determination? Should the management be organized by the health care workers that will manage the patient first? Literature shows that empowering leadership will improve autonomous motivation. One of the key informants also emphasized that they experience no resistance in the preparations for the COVID-19 pandemic with the cooperation of different work force layers because of participatory leadership. Would this be possible in the health system of Zimbabwe?

As visualized in Figure 14 many motivational and demotivational factors have been identified in this study. Some of these are COVID-19 specific, but most of these factors could apply on the existing situation already. There is a strong feeling of protecting relatives for COVID-19. As relatives are an important support system for the sample group of medical doctors, this would be interesting to get more in-depth understanding of. Remuneration and economic hardship might also derive from the importance of supporting relatives. The importance of a support system at the workplace is also an important topic. The ability to learn and to develop as medical doctor was an important factor from the survey and was also reflected in the interviews with the need for supervision and teamwork. In the light of an improved learning environment, medical doctors had more access to advance machines and improved high care units. The improvements of facilities through renovations and procurements that were done due to funds released through the COVID-19 pandemic sound promising on the accessibility and improvement of quality of care for other conditions. There will still be need for maintenance of facilities and equipment as well as maintaining HCW skill to work with advanced machines in a health system that is struggling to divide the money that they can spend. Renovations and procurement of more advanced machines should be maintained, but the skills on how to use and maintain these machines should also remain available. Innovations and maintenance should continue. Oxygen concentrators are used in times of COVID but can be as well a very cost-effective way of supporting patients with major illnesses. The medical specialist coming into the province will decrease inequity and the possibility of getting high care (advanced machines, specialists, high quality) in Midlands province might also decrease the morbidity due to timely support of severe cases. Since the physician number is low in Zimbabwe, the question will remain where these medical doctors will come from or if the key informants refer to returning medical doctors. Local incentives and participatory leadership were emphasized by one of the key informants and were both an attraction of staff to their hospital and a factor for high retention and less turnover in their facility. There are no figures to reflect this, but hopefully these figures become available in the future.

Retention and attraction of staff will continue to be a hot topic in the future. In the light of Code of Practice, there will be need for high income countries as well to review their work force and invest in the brain gain in

low- and middle-income countries. Current migrant HCW will need incentives to go back home and support their health care system to grow and continue to develop, next to investments in training in medical doctors. Medical doctors remaining in Zimbabwe had enough *Stick* factors to stay or self-determination to continue to work with shortages and support their health system in times of need. Some participants had responded to the survey that they experienced increased motivation with eagerness to save lives or emphasized that they believed that they could make a difference during the COVID-19 pandemic. These remarks are important *Stick* factors. The COVID-19 pandemic was a way of being able to start addressing mental health needs for medical doctors, but shortage and a strained system was not new to Zimbabwe. For future research there are many possibilities to get a more in-depth understanding of *Push*, *Pull*, *Stick* and *Stay* factors. Especially, when the *Stick* factors for the current workforce become clear and the factors to return become clear for the migrant medical doctors.

Conclusion

COVID-19 has a major impact on HCW in an already strained health care system. The limitation of the small sample size in this study have been compensated with supplemental interviews and literature study to provide a broad overview on motivation to work by non-specialist medical doctors in Midlands province, Zimbabwe. The COVID-19 pandemic has showed a positive effect on the preparedness of the province for a future outbreak. The improvement of facilities by renovations, medical doctors training in managing COVID-19 cases, more advanced machines and the implementation of high care units in the province will improve the quality of services and access to equitable health care in the province.

As for motivation to work, important factors for a positive effect on the non-specialist medical doctors were the possibility to learn more during COVID-19 outbreak, the job being a fundamental part of them and their drive to be successful. Positive motivators were teamwork, improved supervision, and the availability of protective equipment. Work strain and low appreciation because of the low remuneration were demotivating for medical doctors. Other demotivators were shortage of staff, shortage of materials, anxiety of getting infected, anxiety of transmitting it to their relatives and workload. These were all mentioned COVID-related, but according to key informant interviews, most of these factors were long existing. Remuneration was an important demotivating factor mentioned in all parts of this study.

The socioeconomic situation and the strained health system in Zimbabwe pushed medical doctors toward high income countries. At the same time, the COVID-19 pandemic provoked an increased *Pull* factor because of relaxation of VISA procedures in high income countries. This research shows an alarming risk of the current workforce having high risk of resignation. It remains unclear if these HCW can stay abroad or if they will have to return to their home country.

Recommendations

MoHCC national level can improve the network of supervision and training possibilities, even short courses, to make sure that the medical doctors do not lose the experience they gained in working with advance equipment. They will need to address the medical doctor's shortage, not only to improve health equity, but more important to make sure they retain the current workforce. As salaries are difficult to improve, MoHCC can investigate other remunerations for medical doctors to make sure they feel more appreciated. This could involve some benefits concerning school fees for their children, medical training for themselves, lunches, transportation, agriculture, housing etc. There will be need to investigate the perception of benefits by the medical doctors.

MoHCC local level, PMDs, need to address motivation to work. To understand the individual process and to be able to generalize these results, research on motivation needs to continue. There will be need to mobilize funds to continue this and address the factors that need specific attention. With this last remark, specific attention, the interviews, and in-depth understanding of perceived needs and how to address this, this will show a lot of possibilities for non-financial support as well.

MoHCC local level, PMDs, need to maintain the positive effect of the COVID-19 pandemic of innovations and renovations by maintenance of buildings, retention of staff and continuous training of skills and knowledge of health workforce will be needed. This will reflect on motivation to work since it covers improvement of knowledge, teamwork and a supportive learning environment.

MoHCC national level together with PMDs need to continue mental health support for all HCWs. During the COVID-19 pandemic, chronic stress showed need for mental health support. In a strained health system with chronic shortages, this chronic stress will continue the need for mental health support.

PMDs and medical superintendents need to improve participatory leadership as it has shown to improve organizational structures. To stimulate the medical doctors and improve self-determination, organizational commitment is needed. There is need to improve self-determination to improve retention.

High income countries will need to address the large *Pull* factors that they have on low-and-middle income countries. After COVID-19, there will be a need to review motivation to work by medical doctors, or even the health care workforce, to evaluate if there are possibilities to improve the *Stay* factors and reduce the *Push* factors to reverse the brain drain.

MoHCC together with World Health Organization, OECD countries, the European Union and other Non-Governmental Organizations, like WEMOS, need to combine a health system strengthening program for both existing workforce and returning workforce with special attention for mental health needs, innovation, reduced workload and improved remuneration. This was agreed upon in the WHO Global Code of Practice on the International Recruitment of Health Personnel. Together they will have to build the post-COVID well motivated health workforce. The medical work force that stayed behind should get the same incentives as the migrant doctors returning home to improve retention as well as cyclic migration. Mental health support should continue since the COVID-19 pandemic started mental health programs. Mental health issues like depression and anxiety due to the chronic stress they experienced and the work strain due to shortages in staff with all regulations around managing COVID-19 outbreak, were not compensated well enough.

Africa Centers for Disease Control and Prevention together with MoHCC need to improve remigration possibilities for medical doctors by improving training environments in hospitals, participatory leadership, improved remuneration, easy registration and improving *Stick* factors.

ANNEX

ANNEX 1 Questionnaire for electronic survey with subscale on motivation
ANNEX 2 Consent Forms
ANNEX 3 Topic Guide Key Informant Interviews and In-depth interviews
ANNEX 4 Results of statistical analysis

ANNEX 1 Questionnaire for electronic survey

Hereby I consent with using my answers for data analysis and by entering my email address at the start, I allow you to approach me in case I get selected for an in-depth interview. All answers are confidential. Data will be processed anonymous. Your email address will only be used to contact you for the in-depth interview and will be deleted after conducting the interviews. You will read a series of statements on reasons why persons do the work they do. If you would like to be informed about the results, please leave your email address at the end of the survey.		
For each of the statements, please tell write down to what extent they apply for you.		
Sex: male/female Age (years): 20-24/25-29/30-34/35-39/>40 Work experience since finishing medicine (years): 0-2, 3-5, 5-10, >10 Current position: Public provincial hospital/district hospital/semipublic hospital, private hospital Working as: JRMO/SRMO/GMO/DMO/medical superintendent/ other Email address:		
1. I work in this job for the income it provides me.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	external regulation subscale
During COVID 19 my income:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
2. I do my job because this is the type of work I chose to do to attain a certain lifestyle.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	identified regulation subscale
With COVID 19 my lifestyle:	1. improved a lot 2. improved a little 3. Neither agree nor disagree 4. deteriorated a little 5. deteriorated a lot 96. Respondent does not wish to answer	
3. I work in this job because I derive much pleasure from	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	intrinsic motivation subscale

learning new things.		
With COVID 19, I learned new things:	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	
4. I don't know why I'm working in this job, I don't seem to be able to manage the important tasks related to this work.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	reverse amotivation subscale
With COVID 19, the amount of managing important tasks related to this work:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
5. I work in this job because my work has become a fundamental part of who I am.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	integrated regulation subscale
With COVID, my work was still a fundamental part of who I am	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	
6. I want to succeed at this job, if not I would be very ashamed of myself.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	introjected regulation subscale
With COVID, I felt successful in my job	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	
7. I work in this job because I chose this type of work to attain my career goals.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	identified regulation subscale

With COVID, attaining my career goals:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
8. I work in this job for the satisfaction I experience from taking on interesting challenges.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	intrinsic motivation subscale
With COVID, the satisfaction I experienced from interesting challenges:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
9. I work in this job because it is part of the way in which I have chosen to live my life.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	integrated regulation subscale
With COVID, my job was a choice to live my life:	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	
10. I want to be very good at this work, otherwise I would be very disappointed.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	introjected regulation subscale
With COVID, my performance at work:	1. improved a lot 2. improved a little 3. Neither agree nor disagree 4. deteriorated a little 5. deteriorated a lot 96. Respondent does not wish to answer	
11. I don't know why I work in this job, we are provided with unrealistic working conditions.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	reverse amotivation subscale
With COVID,	1. increased a lot	

unrealistic working conditions:	2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
12. I work in this job because I want to be a "winner" in life.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	introjected regulation subscale
With COVID wanting to be a "winner" in life:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
13. I work in this job for the satisfaction I experience when I am successful at doing difficult tasks	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	intrinsic motivation subscale
With COVID the satisfaction I experience from working:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
14. I work in this job because this type of work provides me with security.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	external regulation subscale
With COVID security that work provides me:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
15. In this job, too much is expected of us.	1. Strongly agree 2. Agree 3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	reverse amotivation subscale
With COVID expectations of me:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
16. I work in this job because	1. Strongly agree 2. Agree	integrated regulation subscale

it is a part of my life.	3. Neither agree nor disagree 4. Disagree 5. Strongly Disagree 96. Respondent does not wish to answer	
With COVID my job as part of my life:	1. increased a lot 2. Increased a little 3. Neither agree nor disagree 4. Decreased a little 5. Decreased a lot 96. Respondent does not wish to answer	
Did the COVID pandemic change your motivation to work? How?		
Do you have any suggestions or remarks you would like to add?		

ANNEX 2 Consent Forms

2.1 CONSENT FORM – Electronic survey

Participation in this study is strictly voluntary. Please note that, at any point, you are free to decline or withdraw from the electronic survey. The choice that you make will have no bearing on your job or on any work-related evaluations or reports. You may change your mind later and stop participating even if you agreed earlier. The questionnaire is the same for all participants.

Motivation is very dependent on context and time. This study is part of a thesis research for a Masters degree. The research will be conducted in order to assess factors of motivation to work and the impact of the coronavirus pandemic. Participants are all non-specialist medical doctors working in Midlands Province, Zimbabwe. There will be no adverse effects. There will be no awards for participation. You will be asked to give some details from your personal setting and your work conditions. These details are needed to organize and connect the results to motivational factors. After this some statements will be presented and you will be asked to select how much this applies to your situation. In the end, a blanc field is available for any remarks, extra information or opinions you would like to share. All answers are confidential. Data will be processed anonymous. Your email address will only be used to contact you for the in-depth interview and will be deleted after conducting the interviews.

With this consent form you agree on sharing the final results with parties involved. Final results will be shared with the thesis committee of Royal Tropical Institute (KIT), Amsterdam, the Medical Research Council Zimbabwe (MRCZ) and the Provincial Medical Director (PMD) of Midlands Province, Zimbabwe. If you would like to be informed about the results, please leave your email address at the end. The consent also applies for using the results for possible future publication.

If this survey lead revealed that you need counselling (or psychological support), please contact the researcher. There are psychologists at Gweru Provincial Hospital who will be available through the PMD for counselling. Apart from this, Inuka Coaching has been contacted by the researcher and they are open to meet with participants who express the need for coaching. Through Inuka, participants can get free online coaching or meet a coach in Zimbabwe.

If you have any questions or additional remarks, you can always contact the researcher: Dieke van der Windt, email: diekevanderwindt@gmail.com or whatsapp: 0031622832413.

Personal details that are requested, like salary, gender and age, will only be used to organize results, but will not be shared with other parties. All personal details will stay with the researcher and will be coded. Results will be kept for five years. Confidentiality will be maintained.

2.2 CONSENT FORM – In-depth interview
Participation in this study is strictly voluntary. The interview will take around 60 minutes. Please note that, at any point, you are free to decline or withdraw from this interview. The choice that you make will have no bearing on your job or on any work-related evaluations or reports. You may change your mind later and stop participating even if you agreed earlier. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain.

Motivation is very dependent on context and time. This study is part of a thesis research for a Masters degree. The research will be conducted in order to assess factors of motivation to work and the impact of the coronavirus pandemic. Participants are all non-specialist medical doctors working in Midlands Province, Zimbabwe. There will be no adverse effects. There will be no awards for participation. During the in-depth interview, you will be asked open question that are connected to the statements mentioned in the earlier electronic survey to hear more about what this means to you and get more background information on motivation and the factors.

With this consent form you agree on sharing the final results with parties involved. Final results will be shared with the thesis committee of Royal Tropical Institute (KIT), Amsterdam, the Medical Research Council Zimbabwe (MRCZ) and the Provincial Medical Director (PMD) of Midlands Province, Zimbabwe. If you would like to be informed about the results, please leave your email address at the end. The consent also applies for using the results for possible future publication.

Personal details that are requested, like salary, gender and age, will only be used to organize results, but will not be shared with other parties. All personal details will stay with the researcher and will be coded. Results will be kept for five years. Confidentiality will be maintained. If this interview lead revealed that you need counselling (or psychological support), please contact the researcher. There are psychologists at Gweru Provincial Hospital who will be available through the PMD for counselling. Apart from this, Inuka Coaching has been contacted by the researcher and they are open to meet with participants who express the need for coaching. Through Inuka, participants can get free online coaching or meet a coach in Zimbabwe.

If you have any questions or additional remarks afterwards, you can always contact the researcher:
Dieke van der Windt, email: diekevanderwindt@gmail.com or whatsapp: 0031622832413.

O I agree with the above consent
O I would like to receive the final results by email

ANNEX 3 Topic guide In-depth interviews and Key informant interviews
Questions for the key informant interviews:
60-90 minute interviews with the Provincial Medical Director, the medical superintendent of Gweru Provincial Hospital and a nurse or matron.

- Consent requested
- Number of years in this position
- Topic 1: general background – motivation to become a doctor
    - Why did you become a medical doctor?
    - What pleasure do you get from working
    - Why are you working at your current place
    - What are your reasons to work
- Topic 2: current motivation
    - Why do doctors work at your hospital/in your province
    - Is there special attention for the motivaton to work
    - How can you recognize a motivated doctor
    - Why would someone come late at work
    - Impression urban vs rural
    - What are reasons not to attend to a patient
    - Do you experience any fatigue, emotional instability or do you feel unhappy about the work you are doing now, please explain
- Topic 3: COVID-19 related
    - What did COVID-19 change?

    - What is your perception of the influence of COVID-19 on health care and health seeking behaviour and doctors attending to patients
    - How did your work environment change due to COVID-19
    - Was there special attention to specific factors
    - What was your impression of the motivation to work by your health care workers
    - Would you say you are more motivated or less motivation by COVID-19, please explain
- Topic 4: specific motivational factors that come from the survey and a general summary of the COVID pandemic
    - How do you feel about the changes during the COVID pandemic
    - Do you have any particular stories or experiences
    - The survey showed that doctors experienced a high burden, how would you address that?
    - How did your work change you in the past years, did your motivation to work change?
    - Current opinion on how motivation to work could be addressed and what would be needed in your opinion to improve your motivation to work.

Questions for in-depth interviews:
60-90 minute interviews with possible saturation after 12-15 participants.

- Consent requested
- Number of years in this position
- Topic 1: motivational factors
    - Why did you become a medical doctor?
    - What pleasure do you get from working
    - Why are you working at your current place
    - What are your reasons to work
- Topic 2: demotivational factors
    - Why would you come late at work
    - What are reasons not to attend to a patient
    - Do you experience any fatigue, emotional instability or do you feel unhappy about the work you are doing now, please explain
- Topic 3: COVID-19 related
    - What did COVID-19 change?
    - What is your perception of the influence of COVID-19 on health care and health seeking behaviour and doctors attending to patients
    - How did your work environment change due to COVID-19
    - Would you say you are more motivated or less motivation by COVID-19, please explain
- Topic 4: specific motivational factors that come from the survey
    - The survey showed that doctors experienced a high burden, do you recognize that?
    - The survey also showed that some of you felt that they had the possibility to learn a lot, how did you experience this?
    - How did your work change you in the past years, did your motivation to work change?
    - Current opinion on how motivation to work could be addressed and what would be needed in your opinion to improve your motivation to work.

Annex 4 Results

Table 1. Statistical analysis on all statements and questions from the electronic survey. Items were rated on a 5-point Likert scale ranging from 1 to 5.

		N	mean	SD	skewness	Pearsons r
Amotivation	AMO4.	16	4,00	0,730	-1,174	-0,153
	AMO COVID4	15	1,33	0,617	1,762	
	AMO11.	16	2,81	1,167	0,412	0,750
	AMO COVID1	16	1,88	0,885	0,268	
	AMO15.	16	1,56	0,727	0,942	0,537
	AMO COVID1	16	1,38	0,619	1,505	
External regulation	EXT1.	16	3,13	1,310	-0,260	0,229
	EXT COVID1.	16	2,69	1,250	-0,489	
	EXT14.	16	2,88	1,360	-0,290	0,372
	EXT COVID14	16	2,63	1,088	0,166	
Introjection regulation	INTRO6.	16	3,88	1,147	-0,634	-0,130
	INTRO COVID	16	3,03	1,289	-0,131	
	INTRO10.	16	3,63	1,088	-0,189	0,202
	INTRO COVID	16	3,31	0,873	0,662	
	INTRO12.	16	3,81	0,991	-0,192	0,634
	INTRO COVID	16	3,25	1,125	0,080	
Identified regulation	IDEN2.	16	3,88	0,806	-0,627	-0,369
	IDEN COVID2	16	2,56	1,094	0,343	
	IDEN7.	16	4,13	0,719	-0,192	-0,032
	IDEN COVID7	16	2,63	0,719	-0,500	
Integrated regulation	INTEG9.	16	3,94	0,772	-0,881	0,487
	INTEG COVID	16	3,25	0,931	0,000	
	INTEG5.	16	4,13	0,885	-0,927	0,748
	INTEG COVID	16	4,25	0,856	-1,274	
	INTEG16.	16	4,13	0,619	-0,060	0,616
	INTEG COVID	15	3,6	1,056	0,118	
Intrinsic motivation	IM3.	16	3,81	1,109	-1,259	0,668
	IM COVID3.	16	3,94	1,063	-1,767	
	IM8.	16	3,81	0,981	-0,547	0,279
	IM COVID8.	16	3,00	1,461	-0,147	
	IM13.	16	4,06	0,772	-0,113	0,626
	IM COVID13.	16	3,25	0,931	0,567	

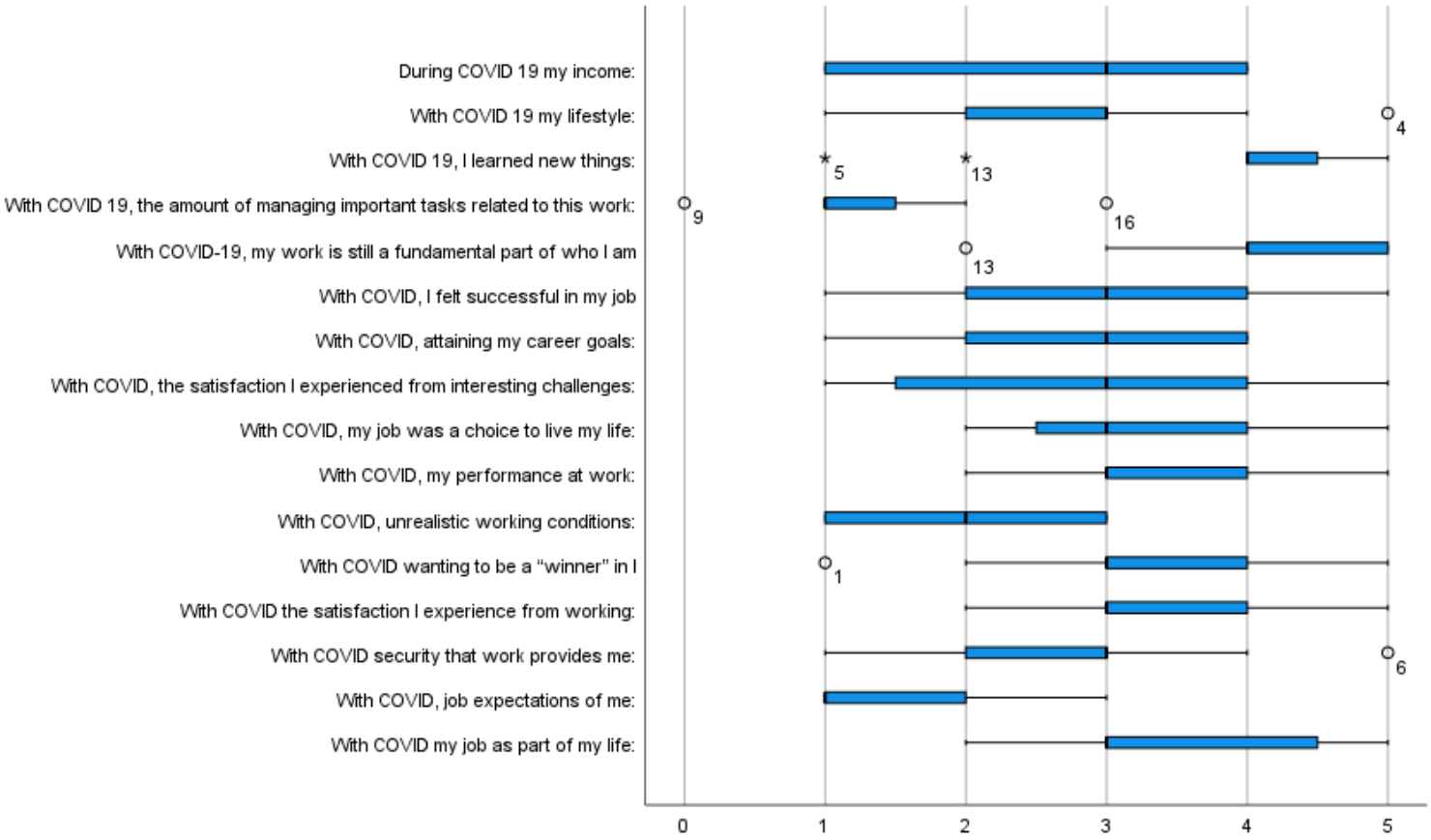


Figure 1. COVID-19 related statements (top 1 to bottom 16). Box plot showing mean, upper and lower quartile, the minimum and maximum. Ranges are from 1 to 5 according to the Likert scale of 1 being decreased a lot to 5 representing improved a lot. 0 being a missing answer. Stars and dots are outliers with the number of the participant. Questions 4, 11 and 15 have been reversed since they represent revered amotivation questions.

Table 2. Individual outcomes on work self-determination index and Pearsons chi square.

Participant	W-SDI score	W-SDI factor increase
F1	8.17	0,65
F2	3.00	2,33
F3	16.17	0,28
F4	2.50	3,13
M1	3.67	1,77
M2	4.00	2,42
M3	6.83	1,46
M4	10.50	1,32
M5	4.67	1,25
M6	2.50	0,93
M7	4.00	1,42
M8	6.83	1,27
M9	6.00	1,03
M10	2.50	2,80
M11	6.00	1,36
M12	3.33	2,20

correlations	Pearsons chi square
Gender and W-SDI	0.256
Age and W-SDI	0.553
Work place and W-SDI	0.471
Work experience and W-SDI	0.509
Position and W-SDI	0.398

REFERENCES

[1] Worldometer. Zimbabwean Population. Online. https://www.worldometers.info/world-population/zimbabwe-population/.

[2] Dieleman M., Watson M. & Sisimayi C. Impact assessment of the Zimbabwe Health Worker Retention Scheme. DFID Human Development Resource Centre. 2012.

[3] Zimbabwe Population Census 2012 Midlands Province. ZimStat. Zimbabwe National Statistics Agency. Online. Zimstat.co.zw.

[4] World Bank. Country Overview Zimbabwe. Website: https://www.worldbank.org/en/country/zimbabwe/overview.

[5] IOM Zimbabwe National Country Strategy 2021-2024. IOM UN Migration.

[6] Midlands Province, Wikipedia. Internet: https://en.wikipedia.org/wiki/Midlands_Province#/media/File:Midlands_districts.png.

[7] World health statistics 2021: monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2021.

[8] World Health Organization 2006. The World Health Report 2006: working together for health.

[9] National Health Strategy for Zimbabwe 2016-2020. Equity and quality in health: Leaving no one behind.

[10] Chibango C. Zimbabwe's Medical Brain Drain: Impact Assessment on Health Service Delivery and Examination of Policy Responses – A Literature Review. *European Journal of Sustainable Development* (2013), 2, 4, 43-58.

[11] Russo G et al. Health workers' strikes in low-income countries: the available evidence. Bull World Health Organ 2019;97:460–467H.

[12] Global strategy on human resources for health: Workforce 2030 World Health Organization, 2016.

[13] BBC News. Zimbabwe doctors end strike after billionaire's offer. Website. 22 January 2020.

[14] Taylor, A.L., Hwenda L., Larsen B.I. M.D., Daulaire, N. Stemming the Brain Drain — A WHO Global Code of Practice on International Recruitment of Health Personnel. *The New England journal of medicine.* 2011; 365:2348-2351.

[15] Witter et al. Results-based financing as a strategic purchasing intervention: some progress but much further to go in Zimbabwe? *BMC Health Services Research* (2020) 20:180.

[16] Kane S, Gandidzanwa C, Mutasa R, et al. Coming full circle: how health worker motivation and performance in results-based financing arrangements hinges on strong and adaptive health systems. *International Journal of Health Policy Management.* 2019;8(2):101–111.

[17] UNICEF 2021. Health Budget Brief Zimbabwe. July 2021.

[18] World Health Organization 2010. Monitoring the Building Blocks of Health Systems: a Handbook of Indicators and their Measurement Strategies.

[19] Sousa A, Scheffler R, Nyoni J & Boerma T. A. Comprehensive health labour market framework for universal health coverage. *Bulletin WHO*, Volume 91,Number 11, 2013, pp892-94

[20] Franco L.M., Bennett S., Kanfer R. Health sector reform and public sector health worker

motivation: a conceptual framework. *Social Science and Medicine.* 54 (2002) 1255–1266

[21] Perreira TA, Innis J and Berta W (2016) Work motivation in health care, a scoping literature review. *International Journal of Evidence-based Health Care*. 14(4):175-182.

[22] Bhatnagar A, Scott K, Govender V, George A. Pushing the boundaries of research on human resources for health: fresh approaches to understanding health worker motivation. *WHO South-East Asia Journal of Public Health.* 2018;7:13-7.

[23] Nguyen H.T.H., Gopalan S., Mutasa R., et al. Impact of Results-Based Financing on Health Worker Satisfaction and Motivation in Zimbabwe: Implications for program design and implementation. Washington, DC: World Bank; 2015.

[24] Mathauer I., Imhoff I. Health worker motivation in Africa: the role of non-financial incentives and human resource management tools. *Human Resources for health* 2006, 4:24.

[25] O'Donoghue D. van der Werff L. Empowering leadership: balancing self-determination and accountability for motivation. Empowering leadership and motivation. *Personnel Review.* May 2021.

[26] Dzinamarira T, Musuku G. Brain drain: An ever-present; significant challenge to the Zimbabwean public health sector. Letter to the editor. *Public Health in Practice*. 2 (2021) 100086.

[27] Dzinamarira, T.; Murewanhema, G.; Mhango, M.; Iradukunda, P.G.; Chitungo, I.; Mashora, M.; Makanda, P.; Atwine, J.; Chimene, M.; Mbunge, E.; et al. COVID-19 Prevalence among Health care Workers. A Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health.* 2022, 19,146.

[28] Maini R., Lohmann J., Mounier-Jack S., Borghi J. Measuring the motivation of health workers: a reflection on the methodological issues and lessons learnt. *Research Square*. 2020.

[29] Borghi J. et al. How to do (or not to do) … Measuring health worker motivation in surveys in low- and middle-income countries. *Health Policy and Planning.* 33, 3018. 192-203.

[30] Grant Murewanhema et al. A descriptive study of the trends of COVID-19 in Zimbabwe from March-June 2020: policy and strategy implications. *Pan African Medical Journal*. 2020;37(1):33.

[31] Dewey C., Hingle S., Goelz E., Linzer M. Supporting Clinicians During the COVID-19 Pandemic. *Annals of Internal Medicine. Ideas and opinions.* March 2020.

[32] Kanekar A & Sharma M. COVID-19 and Mental Well-Being: Guidance on the Aplication of Behavioral and Positive Well-Being Strategies. *Healthcare.* 2020 (8): 336.

[33] Walton M., Murray E. & Christian M.D. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *European Heart Journal: Acute Cardiovascular Care*. 2020(0) 1–7.

[34] Haozheng Cai et al. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China. *Medical Science Monitor*, 2020; 26.

[35] Windarwati H.D. et al. Stressor, coping mechanism, and motivation among health care workers in dealing with stress due to the COVID-19 pandemic in Indonesia. *Asian Journal of Psychiatry.* 56 (2021) 102470.

[36] Mukherjee A. Parashar R. Impact of the COVID-19 pandemic on the human resources for health in India and key policy areas to build a resilient health workforce. *Gates Open Research.* 2020, 4: 159.

[37] Cersich et al. COVID-19 in Africa: care and protection for frontline healthcare workers. *Globalization and Health*. 2020. 16:46.

[38] Ministry of Health and Child Care (MoHCC). Website. COVID 19 updates and situational reports. Online. http://www.mohcc.gov.zw/

[39] Grant Murewanhema et al. The effect of increased mobility on SARS-CoV-2 transmission: a descriptive study of the trends of COVID-19 in Zimbabwe between December 2020 and January 2021. *Pan African Medical Journal.* 2021;39(125).

[40] Grant Murewanhema et al. Drivers of the third wave of COVID-19 in Zimbabwe and challenges for control: perspectives and recommendations*. Pan African Medical Journal*. 2021;40(46).

[41] Porat et al. Public health and risk communication during COVID-19 – enhancing psychological needs to promote sustainable behaviour change. Submission to *Frontiers in Public Health*. 2020.

[42] Mackworth-Young CRS, Chingono R, Mavodza C, McHugh G, Tembo M, Dziva Chikwari C, et al. 'Here, we cannot practice what is preached': early qualitative learning from community perspectives on Zimbabwe's response to COVID-19. *Bull World Health Organisation*. E-pub: 20 April 2020.

[43] Dzinamarira T. et al. Coronavirus Disease 2019 (COVID-19) Response in Zimbabwe: A Call for Urgent Scale-up of Testing to meet National Capacity. *Clinical Infectious Diseases*. 2020;XX(XX):1–8.

[44] Katsidzira L., Gwaunza L. & Hakim J.G. The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Epidemic in Zimbabwe: Quo Vadis? *Clinical Infectious Diseases.* 2020;XX(XX):1–4.

[45] Matsungo T.M. and Chopera P. The effect of the COVID-19 induced lockdown on nutrition, health and lifestyle patterns among adults in Zimbabwe. *BMJ Nutrition Prevention and Health.* https://doi.org/10.1101/2020.06.16.20130278.

[46] Abas, M.A. et all. Building Mental Health Workforce Capacity through Training and Retention of Psychiatrists in Zimbabwe*. International Review of Psychiatry.* 2014; 26 (4): 453-459.

[47] Skelton T, Irakoze A., Bould M.D., Przybylak-Brouillard A., Twagirumugabe T. Livingston P. Retention and Migration of Rwandan Anesthesiologists: A Qualitative Study. *Anesthesia and Analgesia.* April 2020.

[48] Lohmann J., Souares A., Tiendrebéogo J, Houlfort N., Robyn P.J., Somda S., De Allegri, M. Measuring health workers' motivation composition: validation of a scale based on Self-Determination Theory in Burkina Faso. *Human Resources for Health.* 2017. 15:33.

[49] Tremblay M.A., Blanchard C.M., Taylor S., PelletireL.G., Villeneuve M. Work Extrinsic and Intrinsic Motivation Scale: Its Value for Organizational Psychology Research. *Canadian Journal of Behavioural Science.* 2009; 41 (4). 213-226.

[50] Gagné M. & Deci E.L. Self-Determination Theory and Work Motivation. *Journal of Organizational Behavior*. Jun 2005, 26 (4). 331-362.

[51] Lohmann J., Wilhelm D., Kambala C., Brenner S., Muula A.S, De Allegri M. 'The money can be a motivator, to me a little, but mostly PBF just helps me to do better in my job.' An exploration of the motivational mechanisms of performance-based financing for health workers in Malawi. *Health Policy and Planning*, 33, 2018, 183–191.

[52] Ndoma S. Almost half of Zimbabweans have considered emigrating; job search is main pull factor, *AFRO Barometer*. August 2017. https://afrobarometer.org/sites/default/files/publications/Dispatches/ab_r6_dispatchno160_zimbabwe_emigration.pdf.

[53] World Migration Report 2022. IOM UN Migration.

[54] CORONAVIRUS COVID-19 ZIMBABWE. Facebook group. www.facebook.com/groups/212994439766842.

[55] Bowles J., Larreguy H. Liu S.Countering misinformation via WhatsApp: Preliminary evidence from the COVID-19 pandemic in Zimbabwe. *PLoS One.* 2020; 15(10): e0240005.

[56] Internet: Migration and Covid deaths depriving poorest nations of health workers. Online: https://www.theguardian.com/global-development/2021/jul/19/migration-and-covid-deaths-depriving-poorest-nations-of-health-workers.

[57] OECD 2020. Contribution of migrant doctors and nurses to tackling COVID-19 crisis in OECD countries. Online: https://read.oecd-ilibrary.org/view/?ref=132_132856-kmg6jh3kvd&title=Contribution-of-migrant-doctors-and-nurses-to-tackling-COVID-19-crisis-in-OECD-countries.

[58] Contending With the Pandemic, Wealthy Nations Wage Global Battle for Migrants. Internet. https://www.nytimes.com/2021/11/23/world/asia/immigration-pandemic-labor-shortages.html.

[59] Article 5.1 of WHO Global Code of Practice on the International Recruitment of Health Personnel. Online: https://www.who.int/hrh/migration/code/WHO_global_code_of_practice_EN.pdf

[60] Baker,C. NHS staff from overseas: statistics. *House of Commons library.* 20 September 2021.

[61] Fagan JJ, Cairncross L, Biccard B. Fieggen G, Maswime S. COVID-19 exposes health worker shortages in the USA and UK, but nationalism and self-interest must not exploit medical workforces from low and middle-income countries*. South African Medical Journal* 2020;110(5):335.

[62] Tralac document on COVID brief. Conference brief COVID accelerates Africa's medical brain drain. July 2021. Online.

[63] SABC News. Zimbabwe hit by a exodus of health professionals amid the COVID-19 pandemic. Internet. 16 December 2021.

[64] Witter et al. The gendered health workforce: mixed methods analysis from four fragile and post-conflict contexts. *Health Policy and Planning*, 2017. 32. v52–v62.

[65] Campbell J, Buchan J, Cometto G,David B, Dussault G, Fogstad H, Fronteira I, Lozano R, Nyonator F, Pablos-Méndez A, Quain EE, Starrs A & Tangcharoensathienk V (2014) Human resources for health and universal health coverage: fostering equity and effective coverage. *Bulletin of the World Health Organisation 2013* Nov 1;91(11):853-63.

[66] S. Mukwenha, T. Dzinamarira, O. Mugurungi et al.. Maintaining robust HIV and tuberculosis services in the COVID-19 era: A public health dilemma in Zimbabwe . *International Journal of Infectious Diseases 100* (2020) 394–395.

[67] Mvunge E, Millham R, Sibaya N, Takavarasha Jr S. Is malaria elimination a distant dream? Reconsidering malaria elimination strategies in Zimbabwe. *Public Health in Practice* 2 (2021) 100168.

[68] Justus Uchenna Onu, Sunday O Oriji, Deborah Oyine Aluh, Tonia C Onyeka. Aftermath of COVID-19: Forestalling Irreparable Medical Brain Drain in Sub-Saharan Africa. *Journal of Health Care for the Poor and Underserved*, 2021. 32 (4), 1742-1751.

[69] Ogundele S. Global inequities intensify debate on decolonizing health care. *Healthy Debate Online.* https://healthydebate.ca/2021/05/topic/decolonizing-global-health/.

[70] Africa's health boss seeks to tempt expat medics to come back home. *The observer Coronavirus.* 23 January 2022.