**COVID-19 Preventive Health Behaviors: A Cross-Sectional Analysis Using the Health Belief Model in Kinshasa**

\*Bontango-Kweme Frederic1, Yassa Yoniene Pierre2, Kalunga Mbuba Justin1, Ekamu Okito Celestin³

1School of Public Health, University of Kalemie 2Faculty of Medicine, University of Kaziba ³Mcking Consulting Corporation \*emmanuellabontango@gmail.com

**Abstract**

COVID-19, recognized as a communicable viral disease and declared an International Public Health Concern by the WHO in 2020, necessitates effective public health interventions, with social distancing being a key tool in the control of the pandemic. Despite its acknowledged importance, there exists a limited understanding of the extent to which Health Belief Model (HBM) constructs relate to preventive health behaviors. This study aims to evaluate the relationships between HBM constructs and preventive health behaviors among adults during the COVID-19 pandemic, utilizing HBM as the theoretical framework. Quantitative data were collected through a Likert scale survey employing a random sampling method, with a sample size of 750 participants. The collected data underwent analysis using SPSS. Spearman's rho revealed weak, moderate, and strong positive correlations among HBM constructs and preventive health behaviors (rho = .126, p = .001; rho = .475, p = .000; rho = .563, rho = .643, and rho = .653, p = .000). In conclusion, this study highlights a substantial adoption of preventive health behaviors among adults in response to the COVID-19 pandemic, as indicated by the relationships observed with HBM constructs.

*Key Words*: Social distancing, COVID-19, practice, compliance, HBM

# Introduction

The World Health Organization (2020) designated COVID-19 as a Public Health Emergency of International Concern, identifying it as a communicable viral disease that emerged in December 2019 in Wuhan City, China (WHO, 2020). As of July 9, 2022, Africa has reported over 8 million confirmed cases (WHO, 2022), showcasing the significant impact of COVID-19 since its inception. This global disruption has profoundly affected various aspects of daily life for individuals. The transmission of COVID-19 primarily occurs through respiratory means, involving small droplets (aerosols < 0.5 μm diameter) when an infected person coughs, sneezes, or talks in close proximity (˂1.5-2.0 m) to others (Chan et al., 2015, p. 515; WHO, 2020). Controlling COVID-19 necessitates a combination of biological and non-biological interventions. While biological interventions, such as vaccines, require high coverage for community herd immunity, only 11.4% of the targeted population in the Democratic Republic of Congo is fully immunized (CMR COVID-19, 2022). Therefore, ongoing and sustained adherence to public health interventions, including the practice of social distancing, plays a crucial role in controlling COVID-19 by reducing spatial and temporal contact among people (Talic et al., 2021, pp. e2997-e3008).

The study "Organizational-level determinants of participation in workplace health promotion programs: a cross-company study" conducted by Lier et al., 2019 explores how factors at the organizational level influence employee participation in corporate health programs. This research provides insights for companies looking to maximize participation in health promotion programs and adds to the understanding of the impact of organizational factors on enrollment rates. The Health Belief Model (HBM) incorporates essential constructs that drive health behaviors, encompassing perceived threat to a health condition, expected outcomes associated with specific behaviors, and self-efficacy—the behavior an individual engages in to achieve the expected outcome. The HBM aids in comprehending the relationship between health conditions and preventive measures, such as the practice of social distancing among adults for COVID-19 prevention. Boyle (2017) suggests that individuals may adjust their attitudes toward behavioral changes by framing the change positively. However, the extent to which HBM constructs are linked to preventive health behaviors at the community level remains poorly understood (Shewasinad Yehualashet et al., 2021, p. 17). Consequently, this analytical cross-sectional study aims to assess the relationship between HBM constructs and preventive health behaviors among adults in Kinshasa during the COVID-19 pandemic from March to April 2022.

# Materials and Methods

***Study Design and Period:*** this analytical cross-sectional study was conducted from March 1st to April 30th, 2022.

***Study Setting:*** this investigation was conducted in Kinshasa, the capital and political hub of the Democratic Republic of Congo, situated in the western part of the country along the Congo River. Comprising four districts and twenty-four municipalities, Kinshasa was strategically chosen for its pivotal role as the epicenter of the COVID-19 outbreak within the region. The city's selection was further justified by its high population density, which presents unique challenges and insights into the practice and impact of social distancing. Additionally, Kinshasa has been noted for its elevated incidence of asymptomatic COVID-19 cases and a significant rate of mortality among adults, factors that underscore the critical nature of this study's focus within this specific urban landscape.

***Participants:*** The participants for this study comprised adults residing in Kinshasa, aged 19 to 59, during the research period. To be eligible for inclusion, individuals were required to meet the following criteria: they must fall within the specified age bracket, possess fluency in either French or Lingala to ensure comprehensive understanding and communication, and demonstrate the capacity to give informed verbal consent. These criteria were established to ensure a representative sample of Kinshasa's adult population, facilitating meaningful insights into their experiences with social distancing practices amid the COVID-19 pandemic.

***Sample Size and Method:*** based on Shahnazi et al. (2020), 750 adults were sampled using a two-stage probability method: stratified sampling by municipality, followed by simple random sampling within each stratum (McCombes, 2021).

***Variables:*** the study examined preventive health behaviors (dependent) against Health Belief Model constructs (independent): perceived susceptibility, severity, barriers, benefits, and self-efficacy.

***Data Collection: a***n anonymous, pen-and-paper Likert scale survey, based on prior research, was used to gather data. Field investigators administered surveys in public areas, following health protocols including mask-wearing and hand sanitization.

***Reliability:*** a test-retest with 25 participants over seven days yielded a Cronbach's alpha of .84, indicating reliable internal consistency (Devellis, 2012).

***Validity***: the Likert scale's content validity was confirmed, accurately capturing the constructs of preventive health behaviors and health belief constructs during the COVID-19 pandemic.

***Data Analysis*:** data captured in Excel were analyzed in SPSS, with findings presented descriptively and in tables.

***Ethical Considerations:*** the study received approval from HRERC-CIREP at the University of Lisala. Participants gave verbal consent prior to data collection.

**Results**

Socio-demographic characteristics of study participants: A total of 750 participants were included in this analytical cross-sectional study. The mean age was 33.4, with a standard deviation of 8.2. Notably, female participation was 21.6% higher than male (60.8% vs. 39.2%). Furthermore, participants with formal education demonstrated a 39.8% higher participation rate compared to those without formal education (69.9% vs. 30.1%). Among participants with formal education, half (50.2%) held a grade 12 level, while 10.3% had a degree level or higher.

Likert scale characteristics: The Likert scale exhibited an overall mean score of 4.06 with a standard deviation of 0.09. Perceived benefits garnered the highest mean score (M = 4.37), whereas perceived susceptibility recorded the lowest (M = 3.02). Standard deviation was notably high for perceived severity (SD = 0.81) and low for self-efficacy (SD = 0.61). The overall agreement response for variable items indicated a high agreement rate (46%) on the agree scale, while the strongly disagree scale exhibited a low response rate (5%), as delineated in Table 1.

Table 1 Agreement Response per Variable Items

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable items | SD | | D | | U | | A | | SA | |
|  | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % |
| psu1 n = 750 | 0 | 0 | 0 | 0 | 62 | 8 | 300 | 40 | 388 | 52 |
| psu2 n = 750 | 0 | 0 | 0 | 0 | 92 | 12 | 360 | 48 | 298 | 40 |
| psu3 n = 750 | 357 | 48 | 270 | 36 | 92 | 12 | 31 | 4 | 0 | 0 |
| psu4 n = 750 | 328 | 44 | 302 | 40 | 89 | 12 | 31 | 4 | 0 | 0 |
| pse1 n = 750 | 0 | 0 | 31 | 4 | 150 | 20 | 332 | 44 | 237 | 32 |
| pse2 n = 750 | 0 | 0 | 30 | 4 | 120 | 16 | 422 | 56 | 178 | 24 |
| pse3 n = 750 | 0 | 0 | 61 | 8 | 153 | 21 | 294 | 39 | 242 | 32 |
| pse4 n = 750 | 0 | 0 | 30 | 4 | 120 | 16 | 453 | 60 | 147 | 20 |
| pba1 n = 750 | 0 | 0 | 30 | 4 | 60 | 8 | 425 | 57 | 235 | 31 |
| pba2 n = 750 | 0 | 0 | 30 | 4 | 60 | 8 | 333 | 44 | 327 | 44 |
| pba3 n = 750 | 0 | 0 | 30 | 4 | 60 | 8 | 360 | 48 | 300 | 40 |
| pba4 n = 750 | 0 | 0 | 30 | 4 | 60 | 4 | 362 | 48 | 328 | 44 |
| pbe1 n = 750 | 0 | 0 | 0 | 0 | 60 | 8 | 362 | 48 | 328 | 44 |
| pbe2 n = 750 | 0 | 0 | 0 | 0 | 60 | 8 | 357 | 48 | 333 | 44 |
| pbe3 n = 750 | 0 | 0 | 0 | 0 | 60 | 8 | 329 | 44 | 361 | 48 |
| pbe4n = 750 | 0 | 0 | 0 | 0 | 60 | 8 | 420 | 56 | 270 | 36 |
| se1 n = 750 | 0 | 0 | 0 | 0 | 60 | 8 | 425 | 57 | 265 | 35 |
| se2 n = 750 | 0 | 0 | 0 | 0 | 60 | 8 | 422 | 56 | 268 | 36 |
| se3 n = 750 | 0 | 0 | 0 | 0 | 60 | 8 | 451 | 60 | 239 | 32 |
| se4 n = 750 | 0 | 0 | 0 | 0 | 89 | 12 | 426 | 57 | 235 | 31 |
| Total n = 15,000 | 685 | 4.6 | 844 | 5.6 | 1,597 | 10.6 | 6,895 | 46 | 4,979 | 33.2 |

*Note:* psu = perceived susceptibility, pse = perceived severity, pbe = perceived benefits, pba = perceived barriers, se = self-efficacy, SD = strongly disagree, D = disagree, U = undecided, A = agree, SA = strongly agree

The inclusive frequency response for the variable items for the preventive health behaviors was almost half (49.9%) for always scale whereas null (0.0%) for never scale as displayed in Table 2.

Table 2 Frequency Response Distribution per Variable Item

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Preventive health behaviors | Never | | Occasionally | | Sometimes | | Often | | Always | |
|  | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % |
| phb1 n = 750 | 0 | 0 | 30 | 4 | 59 | 8 | 331 | 44 | 330 | 44 |
| phb2 n = 750 | 0 | 0 | 30 | 4 | 30 | 4 | 269 | 36 | 421 | 56 |
| phb3 n = 750 | 0 | 0 | 30 | 4 | 30 | 4 | 304 | 41 | 386 | 51 |
| phb4 n = 750 | 0 | 0 | 30 | 4 | 118 | 16 | 243 | 32 | 359 | 48 |
| Total n = 3,000 | 0 | 0 | 120 | 4 | 237 | 7.9 | 1,147 | 38.2 | 1,496 | 49.9 |

Note: phb = preventive health behaviors

The data notably reveals that nearly half (49.9%) of the participants consistently engage in preventive health behaviors, with an unexpected absence of non-adherence (0.0%).

The study objective is to assess the relationship between the HBM constructs and the preventive health behaviors of the adults during COVID-19 pandemic in Kinshasa. There is positive correlation between the HBM constructs and the preventive health behaviors. The study’s participants differently adopted the preventive health behaviors against COVID-19. Firstly, some participants adopted the preventive health behaviors against COVID-19 due their susceptibility (rho = .126). Secondly, a number of participants believed to the seriousness of COVID-19 to adopt the preventive health behaviors (rho = .475). Finally, other participants believed to benefits, self-efficacy and barriers to embrace the preventive health behaviors (rho = .563, rho = .643 and rho = .653). Among these groups of participants, the group of the participants who believed to benefits, self-efficacy and barriers practiced much preventive measures followed by the group of participants who believed to the seriousness of COVID-19, thereafter those who believed their susceptibility towards COVID-19.

Kolmogorov-Smirnov test of normality was performed to assess the distribution of the variables in the study dataset. Kolmogorov-Smirnov test showed that all variables were not normally distributed (variables were statistically significant at the *p* = .000 level).

The Spearman rank-order correlation showed statistically significant correlation at the *p* = .01 level between the HBM constructs and the preventive health behaviors. Therefore, there was positive correlation between the HBM constructs and the preventive health behaviors.

There were found three different strengths of correlation as follows:

* There was weak positive correlation (rho = .126, significant at *p* = .001 level) between the perceived susceptibility and the preventive health behaviors
* There was moderate positive correlation (rho = .475, significant at *p* = .000 level) between the perceived severity and the preventive health behaviors
* There were strong positive correlations (rho = .563, rho = .643 and rho = .653, significant at *p* = .000 level) respectively among the perceived benefits, self-efficacy, perceived barriers and the preventive health behaviors.

**Discussion**

Our study indicates a positive correlation between Health Belief Model (HBM) constructs and preventive health behaviors among adults in Kinshasa during the COVID-19 pandemic. This is consistent with previous research showing positive links between perceived benefits, self-efficacy, perceived severity, and preventive behaviors (Shah et al., 2021; Kuang et al., 2020; Ding et al., 2020; Luo et al., 2021; Rui et al., 2021; Karout et al., 2020; Peres et al., 2020; Vally, 2020; Pérez-Fuentes et al., 2021; Rana et al., 2021; Xiu et al., 2021).

However, our findings diverge from Abd Elhameed Ali et al. (2021) and Kim et al. (2020), who observed negative correlations between perceived barriers, perceived susceptibility, and preventive behaviors. This discrepancy may stem from the influence of individual health risk perceptions on behavioral responses. Caution is advised in interpreting these results due to constraints such as small sample size and the potential non-representativeness of the sample. The randomness of participant selection further necessitates careful extrapolation of these findings to the wider population.

Our study found a positive relationship between Health Belief Model constructs and preventive health actions in Kinshasa during COVID-19, aligning with existing literature on the influence of perceived benefits, self-efficacy, and perceived severity on such behaviors. While our results differ from some previous studies regarding perceived barriers and susceptibility, these variations could be due to individuals' unique health risk perceptions. Interpretation of these findings should be cautious, considering the study's limitations like small sample size and potential sample non-representativeness.

**Conclusion**

In summary, the outcomes unequivocally manifest a noteworthy adoption of preventive health behaviors among adults at diverse levels during the COVID-19 pandemic, aligning with the tenets of the Health Belief Model (HBM). In consideration of these findings, two primary recommendations emerge for prospective research endeavors.

Firstly, a more granular exploration into the factors influencing the varying degrees of uptake of preventive health behaviors would provide valuable insights. A nuanced examination of individual characteristics, socio-economic factors, and psychosocial determinants could elucidate the underlying dynamics shaping adherence levels within diverse demographic groups. This could enhance the development of targeted interventions tailored to address specific barriers or facilitators for different populations.

Secondly, an investigation into the long-term sustainability of the observed health behavior changes is warranted. A longitudinal study tracking participants over an extended period would allow for an in-depth understanding of the durability and persistence of these preventive health practices. Such insights are essential for shaping public health strategies that not only respond to immediate crises but also contribute to enduring health resilience in the face of evolving challenges.

These recommendations aim to foster a more comprehensive understanding of the dynamics of preventive health behaviors, providing a foundation for informed public health strategies and interventions. Future research endeavors in these directions can contribute substantively to the ongoing discourse on health behavior during pandemics and other public health emergencies.

**Conflict of Interest**

The authors declare no conflict of interest.

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