

Correlates of COVID-19 Knowledge and Willingness to do a COVID-19 Test among Taxi Drivers in Kingston, Jamaica

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ABSTRACT

Objective

This study sought to describe the knowledge and awareness of taxi drivers in Jamaica regarding COVID-19 and to identify socio-demographic correlates of knowledge. This study also examined the relationship between knowledge of COVID-19 and self-reported willingness to do a COVID-19 test.

Methods

In May 2020, a cross-sectional study was done among 282 taxi [drivers](#) in the Kingston and St. Andrew (KSA) metropolitan region in Jamaica. Data were collected using a 28-item anonymized self-administered questionnaire. Knowledge scores were generated and the differences in the mean ranks by socio-demographic variables were examined using the Mann-Whitney U and Kruskal Wallis tests. Logistic regression was used to identify independent predictors of willingness to do a COVID-19 test.

Results

Knowledge score ranged from 2 to 10 (highest possible score 10); median score = 9 (IQR=2). Approximately 83% expressed willingness to take a COVID-19 test. Binary logistic regression revealed that gender and knowledge score were independent predictors of willingness to take a COVID-19 test. With every unit increase in knowledge score, taxi drivers were 1.3 times more willing to take a COVID-19 test (OR 1.3, 95% CI: 1.09-1.55). Compared to males, females were less willing to take a COVID-19 test (OR 0.14, 95% CI: 0.025-0.716).

Conclusion

Taxi drivers had relatively high COVID-19-related knowledge scores. Improved knowledge may positively influence the adoption of COVID-19 prevention 'technologies' and the maintenance of desired behaviors among taxi drivers who collectively have a critical role to play in the reduction of COVID-19 transmission.

Key words: Taxi drivers; COVID-19; Knowledge; Testing; Jamaica

INTRODUCTION

The COVID-19 pandemic due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has inflicted substantial health burden (mortality and morbidity) and massive economic loss on countries all over the world.^{1,2} Efforts to stem the pandemic include attempts to better understand risk factors and risk groups. Various actions to prevent the transmission of corona virus and mitigate the effects of COVID-19 disease have been taken in many countries. Taxi drivers have been identified as one of the occupationally at-risk groups for COVID-19 disease.^{3,4} Additionally, utilization of taxis, a critical and commonly used element of most local transportation systems potentially heightens the risk of COVID-19 as it brings people into close contact within a restricted space. Taxi drivers consequently are at increased risk of getting the disease. In May 2020, among occupational groups in the United Kingdom, taxi drivers (predominantly male) reportedly had the second highest COVID-19 related age-sex standardized death rate, 36.4 per 100,000; a rate even higher than that of male healthcare workers where the corresponding figure was 10.2 deaths per 100,000.⁵ Moreover, the relatively short turnaround time between trips and high turnover of passengers implies that potentially any infected taxi driver can in turn accelerate and amplify community spread of the disease.⁶ In Jamaica, there have been calls by a local taxi association for government to test its taxi driver members for COVID-19 infection, describing transport drivers as being at the 'forefront of danger'.⁷

The taxi industry in Jamaica is an essential part of the transport sector for local commuters; three-quarters of households do not own a motor vehicle.⁸ The Transport Authority of Jamaica, which governs the sector, reports that about 20,492 public passenger vehicles (PPV) are licensed and registered. Taxis commonly are of three functional types: (i) route taxis where passengers pay separate fares along a designated route and may embark or disembark along a route; (ii) hackney carriages - vehicles which stand or ply for hire, and which normally carry no more than four passengers traveling together; (iii) contract carriages (colloquially called 'private' taxis), which are vehicles that under stated contract, carry passengers for reward. A 'fourth group' *de facto* exists, the 'robot taxis' ('illegal,' 'unregistered,' 'informal' drivers); their exact number significant yet unknown. In the capital city and its environs, the greater Kingston and

St. Andrew Metropolitan Area (KSMA), where about a third of the island's population resides⁹, most taxis operate from or traverse through 6-8 major transport hubs. The majority of these function as route taxis (62%), the remainder as contract carriage (23%), and hackney carriages (10%).⁸

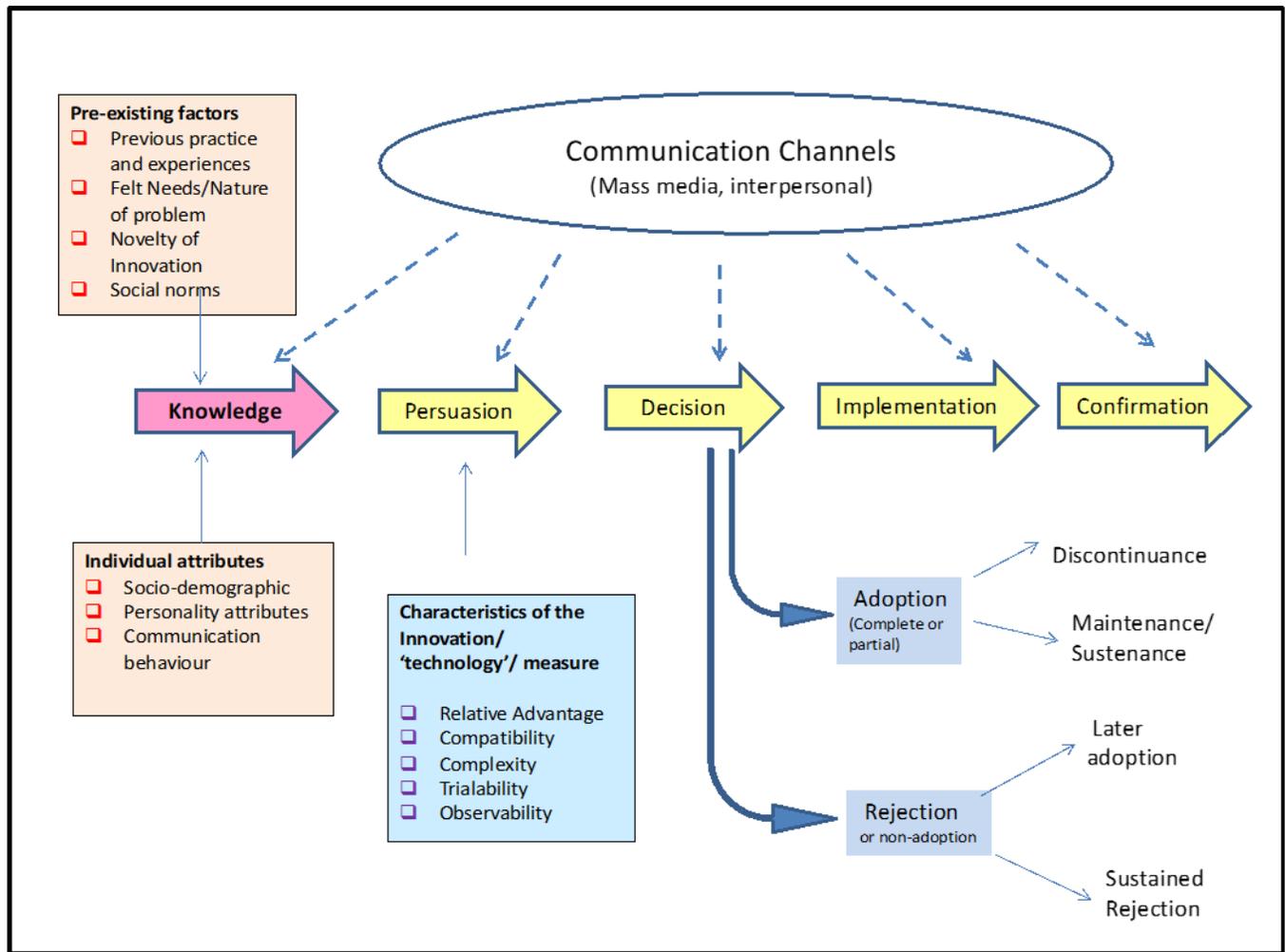
The preventive actions that taxi drivers need to take to reduce the risk of contracting or transmitting COVID-19 are multiple; various guidelines and advisories have been issued.¹⁰⁻¹² These actions include but are not limited to wearing of masks, sanitization of vehicles, increased hand washing and hand sanitizing, reduction of direct cash transactions, and reduction of number of passengers carried in any one trip. These measures dictate that taxi drivers adopt a new *modus operandi*, and new behaviours as they pursue their livelihoods.

Behaviour change is a complex phenomenon, impacted by personal, social, and environmental influences. Factors including knowledge, attitudes and beliefs are well known to impact whether behaviours are adopted and sustained. Many theories and behaviour change models, both prognostic/predictive and explanatory in nature exist^{13,14}, including Innovation-Diffusion Theory¹⁵, in which knowledge is recognized as an important contributory though not necessarily sufficient factor, that determines behaviour and behaviour change. For taxi drivers, COVID-19 mitigation actions employ 'technologies.' In this context, 'technologies' are broadly inclusive of "all tools, machines, utensils, ..., communicating and transporting devices and the skills by which we produce and use them".¹⁶ 'Technologies' and technology use are poignantly exemplified by the wearing of masks, sanitization of vehicles, and hand washing and hand sanitization procedures.

The Innovation-Decision Process outlined by Rogers and rooted in Adoption-Diffusion Theory¹⁵ is illustrated diagrammatically below (Figure 1). It situates knowledge in the process of adopting 'technologies' or 'behaviors.' Applied to taxi drivers, it alludes to the importance of assessing knowledge pertaining to COVID-19 as societies seek to encourage the adoption of anti- COVID-19 measures.

In the knowledge phase, (the first of five phases), there is information seeking and processing. Knowledge reflects awareness of, or exposures pertaining to a phenomenon's existence and an understanding of how it

Figure 1: The Innovation–Decision Process (based on Rogers, 2003)



'works.' Coupled with 'persuasion,' it can shape related positive or negative attitudes. Knowledge may also be derived from experience and social norms and practices which are also part of the settings/environments that influence adoption of behaviour and behaviour change.

Rogers regards communication as a process whereby information is created and shared to promote common understanding.¹⁵ Communication is accomplished via channels between sources and individuals; sources being the origins and purveyors of messages. Mass media and interpersonal communication typify communication channels. The former includes radio, newspaper, TV, social media, and internet sites while the latter embodies two-way communication between individuals. Figure 1 implies that information provided and knowledge about COVID-19 disease can engender beliefs and attitudes that affect whether or not technologies and attendant behaviours are adopted and sustained. Mass media are

cosmopolite in nature and more critical at the knowledge phase while interpersonal channels are more significant at the persuasion phase.¹⁵ Sources of information are important when scrutinizing COVID-19-related knowledge.

Knowledge of COVID-19 has generally been found to be 'good' in various studies.¹⁷⁻¹⁹ Misconceptions regarding COVID-19 were nevertheless found among substantial proportions of survey participants.¹⁹ Gender, age, and residence are correlates of knowledge.²⁰ Knowledge levels have been found to be lower among persons who were older, less educated, rural dwelling and of lower income.¹⁸ Additionally, knowledge was associated with employment, type of occupation and main channel of receiving information.¹⁷ Internet, websites, TV, and social media have been separately named as major sources of information regarding COVID-19.^{17,18,20}

Ascertaining knowledge of COVID-19 is important for at

least three reasons. First, it establishes a baseline assessment of taxi drivers' awareness, and factual notions concerning COVID-19. The efficiency of subsequent educational initiatives may improve by avoiding emphasis on already well-established and understood facts. Second, it can unearth prevailing myths and misperceptions among this occupationally at-risk group. Third, it can help focus subsequent media campaigns and health education/ health promotion efforts; identifying ideas to be reinforced and knowledge gaps to be filled. Additionally, in the context of COVID-19, it may provide some insights on why behaviour change may be pursued or why resistance to such change exists.

This paper describes the knowledge and awareness of taxi drivers in Jamaica regarding COVID-19 and identifies socio-demographic correlates of knowledge. It compares knowledge levels by information sources and examines the relationship of knowledge of COVID-19 and self-reported willingness to do a COVID-19 test.

METHODS

In May 2020, a cross-sectional study was conducted among taxi drivers in the Kingston and St. Andrew metropolitan area (KSMA) in Jamaica. To be eligible for the study, taxi drivers were required to be operating from well-established taxi hubs in the KSMA and be the operator of public or private hackney carriages and route taxis. The hubs constitute a wide cross-section of geographical areas within the KSMA. Taxi drivers (e.g. drivers operating from the airport and those taking tourists on excursions) were excluded from the study as their respective hubs were practically closed due to the COVID-19 outbreak at the time of the study.

It is estimated that 19,000 taxi drivers operate in Jamaica, with approximately 50% operating in the KSMA. At the time of the study, there was a dearth of published peer-reviewed literature on the knowledge, attitudes and practices of taxi drivers pertaining to COVID-19. However, in a study conducted by Geldsetzer (2020), the knowledge and perception of COVID-19 among the general public in the United States and the United Kingdom were examined and it was found that 74.8% of participants from the United States were knowledgeable that droplets were the main mode of transmission of the corona virus.¹⁹ Utilizing that proportion and applying the

usual 95% confidence interval, and 5% margin of error, the minimum required sample was approximately 282.²¹

The sample was obtained using multistage sampling. First, strata were identified (the hubs). Hubs were visited on three randomly selected days during the study period during a given week, at specified periods (8am-12pm and 1pm-5pm). No later hours were looked at due to safety concerns and prevailing curfew restrictions. At the time of visit, alternate taxi drivers lined up at the hubs (systematic sampling 1 in 2) were approached for participation in the study. Approximately forty (40) taxi drivers were obtained at each hub.

Data collection was done over a two-week period in May 2020. An anonymous, self-administered questionnaire consisting of 28 items was used to collect data on the socio-demographic characteristics, characteristics of taxi, knowledge, as well as taxi drivers' willingness to take a COVID-19 test. The questionnaire was developed considering the objectives of the study. It was also structured to include variables relevant to COVID-19 and taxi drivers that emerged from the literature review, as well as issues or concerns in media relating to pandemic in the global, regional, and national spaces. The questionnaire was pre-tested among 30 taxi drivers in another metropolitan area.

Data were analyzed using SPSS version 20. An overall knowledge score was determined by computing the scores for the ten knowledge-related variables. A score of one point was assigned to each correct response to the knowledge related items and no points were awarded if the correct response was not given. The knowledge score potentially ranged from 0-10 with higher scores indicative of greater knowledge. The internal consistency reliability of items used to measure knowledge was 0.62 (Cronbach's alpha). Median knowledge scores were disaggregated by socio-demographic characteristics and the Mann-Whitney U and Kruskal Wallis tests were used to determine differences in the mean ranks for knowledge score as applicable. A 5% alpha level was utilized in determining statistical significance.

Informed consent was obtained for participation in the study. Ethical approval for the study was obtained from the University of the West Indies Mona Campus Research Ethics Committee (ECP 196, 19/20).

RESULTS

Socio-demographic Characteristics of Taxi Drivers

There were 282 taxi drivers in the study. The refusal rate among taxi drivers approached was less than 4% (11 of 293 approached). The majority (97.5%) of taxi drivers was male. Most (56.1%) participants were in the age category 36-55 years. By marital status, 57% of respondents was in established unions (married or living as married). Taxi drivers most frequently (74%) reported secondary level education as their highest education level. Almost 64% of taxis were categorized as hackney carriages (Table 1).

COVID-19 Related Knowledge

Approximately 60% of taxi drivers agreed that the novel coronavirus is a new strain of coronavirus that has not been previously identified in humans, while 29.2% disagreed. Most agreed that the coronavirus can be transmitted from person to person through droplets (85.8%), that someone can become infected with coronavirus by touching contaminated surfaces (84.6%) and that a common symptom for coronavirus infection is coughing (82.5%). Almost 67% of respondents agreed that there is no specific treatment available for COVID-19 and a similar proportion (67.2%) agreed that there is no vaccine available for COVID-19 (both responses being true at the time of the study). Eighty nine percent agreed

Table 1: Socio-demographic characteristics of taxi drivers

Variable	Frequency n (%)
Gender (n=281)	
Male	274 (97.5)
Female	7 (2.5)
Age Category (n=280)	
≤ 35 years	62 (22.1)
36-55 years	157 (56.1)
≥ 56 years	61 (21.8)
Marital Status (n=277)	
In Union	158 (57.0)
Not in Union	119 (42.3)
Highest Level of Education (n=273)	
Primary and below	37 (13.6)
Secondary	202 (74.0)
Vocational	19 (7.0)
Tertiary	15 (5.5)
Numbers of persons in household (n=279)	
Live alone	41 (14.7)
2-4	165 (59.1)
5-7	64 (22.9)
≥ 8	9 (3.2)
Type of Taxi (n=277)	
Route	41 (14.8)
Hackney Carriage	177 (63.9)
Contract Carriage	34 (12.3)
Robot	25 (9.0)

Table 2: Frequency of Responses – Knowledge of COVID-19

Knowledge-related Items	Frequency, n (%)			Total
	Agree	Disagree	Don't know	
A novel coronavirus is a new strain of coronavirus that has not been previously identified in humans	163 (59.5)	80 (29.2)	31 (11.3)	274 (100.0)
Coronavirus can be transmitted from person to person mainly through droplets from an infected person to someone close by who coughs or sneezes	235 (85.8)	24 (8.8)	15 (5.5)	274 (100.0)
Someone can become infected with coronavirus by touching a contaminated surface	231 (84.6)	29 (10.6)	13 (4.8)	273 (100.0)
A common symptom for coronavirus infection is coughing	222 (82.5)	28 (10.4)	19 (7.1)	269 (100.0)
There is no specific treatment available for coronavirus	183 (66.8)	66 (24.1)	25 (9.1)	274 (100.0)
There is no vaccine available for coronavirus	184 (67.2)	61 (22.3)	29 (10.6)	274 (100.0)
COVID-19 can affect your lungs	234 (87.6)	16 (6.0)	17 (6.4)	267 (100.0)
Only elderly persons can be affected by coronavirus	16 (5.8)	259 (94.2)	0.0 (0)	275 (100.0)
Most persons who test positive for coronavirus will die	20 (7.4)	244 (90.0)	7 (2.6)	271 (100.0)
Washing hands with soap and water and using alcohol-based sanitizer can help prevent the spread of COVID-19	242 (89.0)	23 (8.5)	7 (2.6)	272 (100.0)

that washing hands with soap and water and using alcohol-based sanitizer can help prevent the spread of COVID-19 (Table 2).

Knowledge Score by Socio-demographic Variables

Among the taxi drivers studied, knowledge score ranged from 2 to 10 with a median score of 9 (IQR=2). Knowledge score disaggregated by socio-demographic variables revealed no statistically significant associations (Table 3).

Information Sources

Taxi drivers received COVID-19-related information from various sources (Figure 2). The number of sources of information ranged from 0-5 with a median of 1 (IQR = 1). Eighty six percent of cases indicated that they obtained COVID-19-related information from news reports (traditional media), while 51% reported getting information from social media. Only 14% of taxi drivers reported getting their information from the Ministry of Health and Wellness' website. There was no statistically significant correlation between knowledge score and number of information sources (Spearman's rho = 0.12, p=0.059).

Table 3: Knowledge score disaggregated by socio-demographic variables

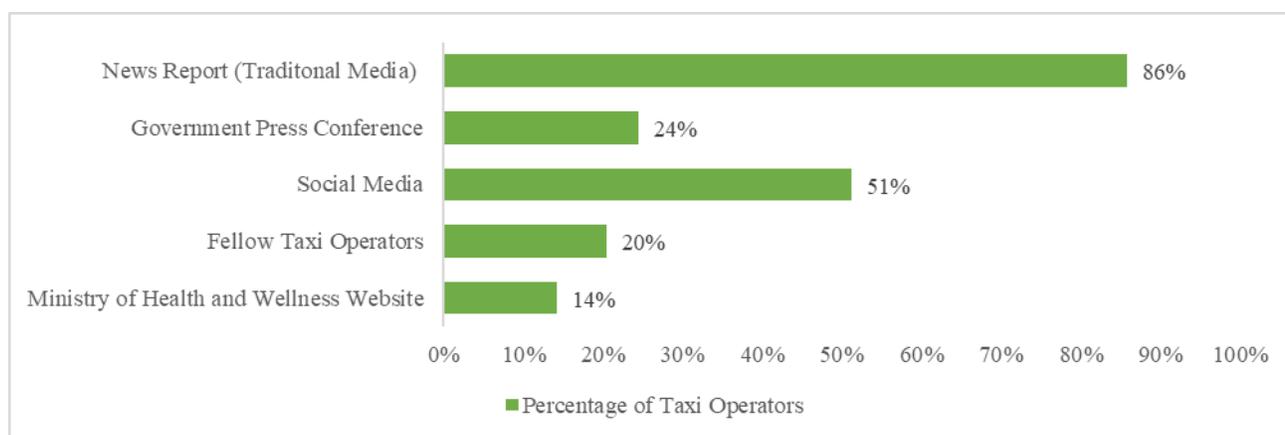
Variable	Knowledge Score			
	N	Median (IQR)	Mean Rank	P-Value
Gender				
Male	246	9.0 (2.0)	125.63	0.212
Female	6	9.0 (2.0)	162.33	
Age Category				
≤ 35 years	56	8.0 (2.0)	122.08	0.194
36-55 years	141	8.5 (2.0)	122.26	
≥ 56 years	55	9.0 (2.0)	141.87	
Marital Status				
In Union	140	9.0 (2.0)	130.23	0.184
Not in Union	109	8.0 (2.0)	118.28	
Highest Level of Education				
Primary and below	34	8.0 (2.5)	118.21	0.939
Secondary	183	9.0 (2.0)	123.58	
Vocational	16	9.0 (2.5)	130.56	
Tertiary	13	9.0 (2.5)	127.46	
Number of persons in household				
Live alone	38	8.0 (2.0)	108.01	0.059
2-4	145	9.0 (1.0)	126.65	
5-7	59	9.0 (3.0)	139.55	
≥ 8	8	7.0 (2.0)	84.13	
Type of Taxi				
Route	35	8.0 (2.25)	123.79	0.652
Public Hackney	159	9.0 (2.0)	126.65	
Private Hackney	32	9.0 (1.75)	126.94	
Robot	22	8.0 (2.5)	106.57	

**p-values generated from Kruskal Wallis (variables with 3 or more categories) and Mann-Whitney-U (variables with 2 categories) tests*

The number of information sources reported by taxi drivers was disaggregated by the knowledge-related items. The mean ranks for the number of information sources used by taxi drivers did not statistically differ by knowledge-related items except in three instances (Table 4). There was a statistically significant difference in the median number of information sources among taxi drivers agreeing (median =2, IQR =2), disagreeing (median 1,

IQR =1) and those who did not know (median = 1.0, IQR = 0.75) that COVID-19 can be transmitted from person to person mainly through droplets from an infected person to someone close by who coughs or sneezes ($H(2) = 9.46, p=0.009$). Likewise, the number of information sources used by those agreeing (median =2.0, IQR 1.25) that common symptom of COVID-19 is coughing, was higher than those disagree or those who did not know

Figure 2: Information source and percentage of taxi drivers reporting use of sources.



(median =1.0, IQR 1.0). Differences were observed in agreement that washing hands with soap and water and using alcohol-based sanitizer can help prevent the spread of COVID-19 by number of sources of information ($H(2) = 8.81, p=0.012$). Higher numbers of information sources were reported by those who agreed.

Willingness to do a COVID-19 Test and Knowledge Score

Among taxi drivers, 82.9% expressed willingness to take a COVID-19 test. The median knowledge score was statistically greater (Mann Whitney $U = 1141 (z = -3.4), p = 0.001$) among those who reported willingness to take a COVID-19 test (median =8.0, IQR = 2.0) than those who were not willing (median = 7.0, IQR =3.3). Bivariate analysis showed no association of willingness to take a COVID-19 test with age, marital status, education household size and type of taxi. Gender was the only other demographic variable that was associated with willingness to take a COVID-19 test (*Fisher's Exact* $p=0.018$); females less often reporting willingness than males (females = 42.9%, males = 83.9%).

Binary logistic regression utilizing gender and knowledge as covariates of willingness to take a COVID-19 test, revealed that both these variables were independent predictors of willingness to take a COVID-19 test. With every unit increase in knowledge score, taxi drivers were 1.3 times more willing to take a COVID-19 test (OR 1.3, 95% CI: 1.09-1.55). Compared to males, females were less willing to take a COVID-19 test (OR 0.14, 95% CI: 0.025-0.716).

DISCUSSION

Study participants had appropriate knowledge of basic facts regarding COVID-19, with knowledge scores being high; median score 90% (9/10). This parallels findings from other developing country settings where with similar questions addressing knowledge domains broached in our study, typical knowledge scores were 92.2%²², 84%²⁰ and 80.5%²³. The internal consistency reliability of items used to measure knowledge was 0.62 (Cronbach's alpha), an acceptable value.²⁴⁻²⁶

There was some uncertainty about specific treatment and causes, with about 33% of individuals giving incorrect or 'don't know' responses. Facts in this area are in a constant state of flux, with various studies in progress, and new information continually emerging. COVID-19, not being previously identified in humans was another area of equivocation with only 60% of taxi drivers concurring with that view. This may be due to the existing panoply of theories and opinions which pervade the media landscape across the world. These may lead to misinformation and confusion.

Knowledge was not correlated with socio-demographic characteristics including education level. This is not surprising as in our study there was little variation in education level, most persons (81%) having secondary/vocation level of education. In other studies done in Egypt¹⁸ and Ghana¹⁷ for example, higher education level was associated with higher knowledge, but in those studies approximately 95% and 70% respectively were listed as having tertiary education. These underlying fundamental dissimilarities in educational profiles may have facilitated greater discernment of differences by

Table 4: Frequency of responses for knowledge-related variables by number of information source

Knowledge-related Variables	Responses	Information Sources		
		Median IQR	Mean Rank	P-Value
A novel coronavirus is a new strain of coronavirus that has not been previously identified in humans	Agree Disagree Don't know	2.0 (2.0) 1.0 (1.0) 2.0 (2.0)	140.73 120.76 150.62	0.078
Coronavirus can be transmitted from person to person mainly through droplets from an infected person to someone close by who coughs or sneezes	Agree Disagree Don't know	2.0 (1.0) 1.0 (1.0) 1.0 (0.75)	141.48 108.83 91.36	0.009*
Someone can become infected with coronavirus by touching a contaminated surface	Agree Disagree Don't know	2.0 (1.0) 1.5 (1.0) 1.0 (1.0)	136.91 129.96 122.65	0.731
A common symptom of coronavirus infection is coughing	Agree Disagree Don't know	2.0 (1.25) 1.0 (1.0) 1.0 (1.0)	139.60 101.57 110.24	0.012*
There is no specific treatment available for coronavirus	Agree Disagree Don't know	1.5 (1.0) 2.0 (2.0) 1.0 (1.0)	137.90 132.91 130.50	0.833
There is no vaccine available for coronavirus	Agree Disagree Don't know	2.0 (1.0) 1.0 (2.0) 1.5 (1.0)	136.64 134.38 135.31	0.978
COVID-19 can affect your lungs	Agree Disagree Don't know	2.0 (1.0) 1.0 (1.0) 1.0 (1.25)	135.73 108.44 109.78	0.152
Only elderly persons can be affected by coronavirus	Agree Disagree	1.0 (1.0) 1.0 (1.0)	133.34 136.70	0.862
Most persons who test positive for coronavirus will die	Agree Disagree Don't know	2.0 (1.0) 1.0 (1.0) 4.0 (4.0)	149.60 131.56 192.57	0.062
Washing hands with soap and water and using alcohol-based sanitizer can help prevent the spread of COVID-19	Agree Disagree Don't know	2.0 (1.0) 1.0 (1.0) 0.5 (1.75)	139.53 115.02 64.71	0.012*

**p-values generated from Kruskal Wallis (variables with 3 or more categories) and Mann-Whitney-U (variables with 2 categories) tests*

educational level, partially explaining the contrasting findings with our study, where less than 6% of study participants had tertiary education.

The relationship between knowledge and number of information sources approached, but did not reach, statistical significance. However, disaggregation by individual knowledge score constituent items, showed associations between specific items and number of information sources. The higher the number of sources, the more likely were participants to report correct information regarding transmission by droplets, cough as a common symptom, and washing hands with soap and water/alcohol-based sanitizers. The use of multiple information sources and multimedia forms can have a positive effect on knowledge.²⁷⁻²⁹ Such use facilitates reinforcement of learning, provision of more details and cross-checking of information. Through multiple sources, multiple opportunities arise by which persons can retrieve, understand and act on health-related information.³⁰ On the other hand, if the information conveyed by multiple sources is incorrect or inconsistent, factual knowledge scores may diminish, weakening the likelihood of finding a positive correlation between overall knowledge score and number of information sources.

There is generally good basic knowledge regarding COVID-19 among taxi drivers in Jamaica. This can serve as a dais on which further knowledge can be built and around which efforts can be directed to accelerate the translation of knowledge to appropriate decision-making and desired actions, and ultimately adoption and maintenance of desired behavior (Figure 1). The use of multiple information and communication channels is critical though not necessarily sufficient to achieve desired outcomes. Beyond the traditional news sources, our findings indicate that social media emerge as important channels for communication and improving knowledge. Health authorities must deliberately increase their presence and health messaging in this competitive space. Major social media platforms e.g., Instagram, YouTube, Twitter, Facebook, TikTok, can be utilized. In social media and the online world, subtleties such as the balance between the aggressive 'hard sell' of information and the 'softer sell and being helpful' must be appreciated.³¹ Too much or too little of each can lead to suboptimal outcomes.

Some gaps in knowledge and misconceptions regarding

COVID-19 exist among taxi-drivers in Jamaica. The findings suggest that there is room for improvement on some issues. For example, when 89% of study participants agree that washing hands with soap and water and using alcohol-based sanitizer can help prevent the spread of COVID-19, it suggests that 11% did not explicitly state this. Additionally, with new developments emerging regarding COVID-19, it is imperative to be current and to disseminate updated information to promote greater knowledge. Case in point: at the time of this study, there was no effective vaccine for COVID-19. Recent news releases indicate that there are now at least four. The aforementioned examples point to areas where health education efforts may be directed. For public health authorities and the media, these present potential priorities for ongoing COVID-19 information campaigns.

Taxi drivers' knowledge may have consequences for behaviour. Our study revealed that greater knowledge scores increased the likelihood of expressed willingness to do a COVID-19 test. The World Health Organization has established testing as a key element for the prevention and control of the COVID-19 pandemic.³² A critical intermediate step on the pathway to doing a test is one's own volition to go and do the test. The degree of willingness to do a test can facilitate or hinder the success of testing programmes. Consistent with the constructs reflected in Figure 1, public health efforts at increasing knowledge potentially can yield benefits of increased adoption of desired behaviour (testing) and better COVID-19 control. Mainstreaming gender in the planning of education and testing initiatives warrants attention. We noted in our study that females were less willing to take a COVID-19 test. The exact reasons for this are unknown and may be further elucidated by future qualitative studies. Females have been reported in the literature as having lower confidence in dealing with the COVID-19 pandemic³³ and this may account for difference regarding willingness to take a COVID-19 test by gender.

In a wider context, assessing, determining, and increasing knowledge among taxi-drivers may assume even greater significance in the near future. Taxi drivers who are an occupationally-at-risk group for COVID-19, may arguably be included in the priority groups to be vaccinated when COVID-19-related vaccination programs are rolled out. There is considerable baseless anti-vaccination rhetoric in the local social media landscape,

including the designation of vaccines as new and dangerous technologies with computer chips and tracking devices to control humans and modify their deoxyribonucleic acid (DNA). Given that some vaccines are based on novel technological approaches involving messenger ribonucleic acid (mRNA), Innovation–Decision and Diffusion-Adoption frameworks thus become increasingly relevant. Without correct and appropriate COVID-19-related knowledge, the uptake of this technology (vaccine) may diminish, hindering COVID-19 containment. COVID-19 cannot be allowed to remain unfettered given the social disruptions, health burdens and economic losses that will continue, if the COVID-19 pandemic persists. Although knowledge does not automatically dictate practice, the importance of ‘knowledge’ - the demonstrated awareness and processing of relevant biomedical facts and concepts should not be overlooked. Populations and sub-populations that are knowledgeable about COVID-19 are increasingly likely to adhere to control measures.³⁴ Knowledge is an influential factor in determining a society’s readiness to embrace behavioural changes recommended by health authorities²³ and the success of COVID-19 response measures partly hinges on knowledge of the public about this disease.³⁵

Our study has a number of strengths and limitations. This study is the first to examine COVID-19 related knowledge specifically among taxi-drivers in the Caribbean region and one of few globally to focus on knowledge in this ‘at risk’ group. The findings add to the COVID-19-related literature as we battle the pandemic. The method used to obtain participants was cost-effective and feasible, given that data were collected during a period of curfew restrictions and confinement. The use of a rapid survey method in subgroups such as taxi drivers in subsequent pandemic situations, may be helpful. Taxi drivers constitute a niche population that is mobile and difficult to comprehensively identify or document. Moreover, in many developing country settings, as in Jamaica, there is constant and substantial ingress and egress of taxis and taxi drivers, legal (registered) and illegal (unregistered, ad hoc, locally called ‘robot’ taxis) to and from the taxi industry. Establishing or accessing complete or almost complete sampling frames (lists of taxi drivers) is practically impossible, and thus orthodox probability sampling procedures such as random sampling could not be pursued. Multi-stage sampling of taxi drivers

was employed and going to the hubs where the taxi drivers ‘are’, was a pragmatic way to obtain a sample. With that approach, we cannot automatically generalize the findings to the entire population of taxi drivers in the Kingston Metropolitan area or Jamaica. The study was confined to capital city and associated metropolitan areas. Nevertheless the approach is well recognized and used a rapid appraisal method to obtain information economically³⁶ and the ‘hubs’ element coupled with various sampling techniques has been advocated for rapid assessment surveys in the transport sector.³⁷

Another limitation is related to the measurement of knowledge. We used a select series of questions to assess knowledge and while reliability was assessed and was acceptable, neither concurrent nor predictive validity has yet been established. However comparison of items used to assess knowledge in our study with those used in other studies^{19,20,22,23} revealed substantial similarities, and suggests content validity. We recognize that there were relatively few females in our study of taxi drivers. Estimates of associations pertaining to gender therefore may be imprecise, and future studies in this area are needed. Our study being cross-sectional captures the situation at a point in time. We acknowledge that information and understanding of COVID-19 is constantly changing and this is being communicated to the public. Consequently, both facts about COVID-19 and responses to the knowledge-related items may change as time progresses. We also recognize that our study did not assess the quality of the information obtained from the myriad of internet sources.

CONCLUSION

Taxi drivers in this Jamaican study had relatively high related COVID-19 knowledge scores. Areas of uncertainty about some facts remain particularly those related to the origin of the SARS-coronavirus-2 and specific treatment and causes of the disease. Increasing number of sources of information was positively correlated with reporting correct information about COVID-19 transmission, common symptoms of COVID-19, washing hands with soap and use of water/alcohol-based sanitizers. Health education campaigns using multiple communication channels, both ‘traditional’ and ‘new’ (social) media are recommended to reinforce correct knowledge and to counter misconceptions and misleading information. Improved knowledge may positively influence the adoption of COVID-19 prevention

'technologies' and the maintenance of desired behaviors among taxi drivers who collectively have a critical role to play in the reduction of COVID-19 transmission.

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