

Cultural adaptation and administration of public awareness questionnaire on hearing health and hearing loss in Karnataka

Jincy Mary Cherian (✉ jincymarycherian123@gmail.com)

Manipal College of Allied Health Sciences: Manipal College of Health Professions

<https://orcid.org/0000-0002-9468-4137>

Bhargavi P.G

Manipal College of Health Professions <https://orcid.org/0000-0002-7952-686X>

Research Article

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Abstract

Background: Good hearing health is necessary for an individual to communicate and stay oriented within the environment. Certain factors like present lifestyle, trauma, illness, genetic disorders, age, and leisure activities can lead to hearing loss when left unattended. The study aims to culturally adapt, administer, and assess public awareness of Karnataka's hearing loss and hearing health.

Method: The design used in this study was a cross-sectional survey design. The sampling method used in this study was Quota sampling. In total, 720 participants aged 20-60 completed a culturally adapted questionnaire. The questionnaire consisted of 22 questions targeting the awareness of hearing loss and hearing health, focusing on four domains: (1) Knowledge about infant hearing loss, (2) Cleaning and treatment, (3) The effect of overexposure to noise and loud sounds, (4) Diagnostic delay.

Results: Approximately 70% of the correct responses were given to almost all the statements. However, specific essential Knowledge was lacking. Only 56% and 50.23% knew about specialized tests available for a hearing evaluation and the recommended standards on the duration of noise exposure.

Conclusion: There is a general lack of public awareness about ringing sensation and its impact on an individual's daily activities. Most people were also unaware of recommendation guidelines regarding reducing exposure duration to high-intensity noises; hence, these findings support the need for noise reduction informative initiatives. In conclusion, this audiological questionnaire appeared to be a simple, practical, and reliable tool.

The outcome showed a need for continued development of comprehensive hearing conservation programs focusing on hearing aid management, early infant hearing loss detection, and noise exposure prevention, which will be necessary to continue developing.

Background

Hearing is a unique and most treasured sense because it allows us to relate to the world for various essential purposes, the most crucial of which will enable us to communicate with others. Our ability to interact with one another is highly reliant on our ability to comprehend speech, which is one of the most mystifying sounds to understand. An individual who cannot hear than someone with normal hearing has hearing loss. India has a considerable number of deaf people. Over 65 million people suffer from hearing loss, which affects 6% of the population (Healthy Ear District in India: Sound Hearing 2030, n.d.).

A few factors that affect hearing health include the present lifestyle, trauma, illness, genetic disorders, age, leisure time activities, exposure to noise, and hearing loss induced by ototoxic drugs. Leaving unattended can lead to hearing loss (Alsudays et al., 2020). Also, the lack of execution of hearing health programs and absence of awareness makes individuals more vulnerable to hearing loss (Fausti et al., 2005).

A persistent ear infection is one of the most prevalent reasons for hearing loss, and it is possible to prevent and treat with medication and surgical procedures. Hearing loss that goes untreated can have various consequences in the workplace and social situations. Therefore, many people with hearing loss are unjustly denied promotions or forced to work at a level below their abilities, expertise, and experience.

The Global Burden of Disease study showed an increased hearing loss burden, which is now alarmingly high (Wilson et al., 2017). They reported that hearing loss is the fourth leading cause of years spent disabled worldwide. Hearing health is about adopting safe listening habits and avoiding excessive loudness and other loud noises during leisure time; hence, proper hearing health is required for an individual to communicate and stay associated with the surroundings.

According to WHO statistics, about 1 billion young people worldwide may be at risk of hearing loss because of harmful listening habits involving personal devices such as earbuds, headphones, speakers, and other similar devices. The rise in usage of devices has highlighted the need to address improper earphone use among youth and encourage effective hearing protection measures. (Mohammadpoorasl et al., 2018 ;di Berardino et al., 2013).

Another common unsafe practice seen among the population is self-ear cleaning, which is the insertion of items like matchsticks, hairpins, application of hot or cold oil, herbal remedies, and liquids such as kerosene into the ear canal to clean it based on the assumption that removing excess cerumen is required for ear hygiene. Using such items to remove wax, blood, or any foreign body in the ear canal can lead to a perforated eardrum, ear discharge, and infection in the ear.

Most educated and illiterate people engage in unhygienic practices and are thus ignorant that poor aural hygiene can lead to several problems. Hearing and balance may be compromised by engaging in harmful or unclean personal practices (Khan et al.,2017). So, it is important to educate individuals about good auditory hygiene. S & Poduval, in 2015, did a study in India to assess public understanding of proper aural hygiene procedures and concluded that misconceptions about the same are not only related to the socio-economic profile of the community but also widespread ignorance. These behaviours can cause hearing loss and alienation and separate people from their activities and society. As a result, knowing about such measures might help individuals become more conscious of their hearing status, recognize early warning signals, and learn about aural hygiene practices. Corrective action can be taken when a risk is identified with this information and can also be used to educate others about hearing health care.

Certain medications like gentamicin, streptomycin, erythromycin, ibuprofen, and anti-cancer drugs can damage the nerves and the cells involved in hearing. Hence, if any of these medications are prescribed, then routine monitoring is essential; thus, no drugs should be taken without the doctor's advice.

Routine hearing tests for persons of all ages are essential to detect any medical condition, identify potential problems, prevent potential impairment, and begin early intervention (Ferguson et al., 2016). Mainly audiologists and otolaryngologists provide specialized audiological services, such as hearing evaluations, hearing aid selection and fitting, and auditory rehabilitation. Several studies on hearing

awareness have been undertaken, and it has been discovered that people with awareness of the risks of ear infections, continuous noise exposure and aural hygiene have less understanding of the audiology profession (Joubert et al., 2017).

Hearing loss can strike at any age. Moreover, a hearing loss in one's early stage can affect their developmental and educational achievements, which can further harm their social and emotional quality of life. Any amount of loss of hearing at any age should not be ignored. Early identification in newborns is crucial, as there could be a chance of undetected conditions due to complications during pregnancy. As a result, diagnosing and treating hearing impairments as soon as possible is critical since they can harm a child's speech and language development, social skills, and educational outcomes.

Sensorineural hearing loss is permanent; hence, early detection and treatment, such as amplification devices on the recommendation of a trained medical professional, are essential. As a result, the progression of hearing loss can be delayed, resulting in a higher quality of life (Galhotra & Sahu, 2019). A simple awareness program would help diminish these problems, reducing morbidity and needing specialist care (S & Poduval, 2015; Alshehri et al., 2019).

Karnataka is the sixth largest state in south India, with diverse communities across districts. According to a survey conducted by the National Program for Prevention and Control of Deafness (2017), 5.3% of the state's population suffers from hearing problems due to a lack of awareness and early detection.

Hence this study aims to assess public awareness of hearing health and hearing loss to initiate early prevention and intervention of hearing loss in Karnataka, which lies in the southern part of India.

Method

Study Design

The data was captured using the online survey method. A cross-sectional study design was employed.

Participants

Quota sampling was used for this study to recruit the participants. This study included 720 male and female participants aged 20-60 years. The age category was split into four groups of 10 years each, and 15 people were selected from each group from 12 districts in Karnataka. To be eligible for the participation, the participants must know to read either Kannada or English and reside in Karnataka for >3 years. All the study participants gave online consent before filling out the google form.

Materials and Procedure

The study tool used for the cultural adaptation was the questionnaire "Public awareness of ear health and hearing loss" formulated by Federica et al. in 2013. It consists of 4 domains: [1] Knowledge about infant hearing loss, [2] Cleaning and treating the ear, [3] Effect of overexposure to noise and loud sounds,

[4] and diagnostic delay. The responses were scored in each domain by giving a "1" for each correct answer and a "0" for incorrect responses.

Procedure

The procedure will be executed in 2 phases.

PHASE-1

Translation, cultural adaptation, and validation of the questionnaire

Content validation

The assessment tool is adapted from the questionnaire formulated by Federica et al. (2013) for their study "Public knowledge of ear and hearing management as measured using a specific questionnaire.". The questionnaire was given to five experienced audiologists to validate the content based on relevance, comprehensibility, and complexity. They were asked to rate each item on a 3-point scale, with 0- being not important, 1- being important with modification, and 2- being extremely important.

Translation and Cultural Adaptation of the questionnaire

Two proficient Kannada-English bilingual speakers translated the revised questionnaire forward (from English to Kannada) and backward (from Kannada to English).

The translated questionnaire was then compared to the original questionnaire to confirm that the forward and backward translations were accurate and that any discrepancies were eliminated. A pilot study with 10 participants was conducted to ensure that the questions were comprehensible and culturally appropriate, and final amendments were made.

PHASE-2

Administration of the questionnaire

Informed consent before the administration of the questionnaire was given to the participants. The questionnaire was given and distributed via Google Forms to people who visited the Audiology department of Kasturba Hospital and the CTC of MCHP, Manipal. The questionnaire was distributed in Google Forms based on the individual's language preference. Demographic details, including name, age, gender, occupation, and educational background, were captured in the google form.

Statistical analysis method

Data obtained through the questionnaire was captured in the excel sheet. The information gathered is entered into SPSS v.27.0 (IBM Corp Released 2020). Cronbach's Alpha was used to estimate the reliability of the tool. Knowledge scores will be calculated accordingly.

Results

In our study, 658 participants answered the online survey out of a total sample size of 720 persons. Thus, a response rate of 91.4% was obtained.

Demographic Data:

Out of the 658 individuals, 54.9% were females (n = 361) and 45.1% males (n = 297). The responses were collected from people aged 20 to 60 in a 10-year age bracket. The demographic characteristics of the samples are presented in Table 1, and the age-wise distribution of responses obtained in each district is shown in Figure 1 (Supplementary Table S1).

Table 1 *Demographic characteristics of the sample*

DEMOGRAPHIC DETAILS	FREQUENCY	PERCENTAGE (%)
AGE		
20-30	345	52.40
30-40	127	19.30
40-50	74	11.20
50-60	112	17
GENDER		
Female	361	54.90
Male	297	45.10
EDUCATION		
General literate (up to 8 th grade)	16	2.40
Basic literate (up to 10 th grade)	40	6.10
Secondary level (up to 12 th)	39	6.00
Diploma	20	3.00
Bachelors & above	543	82.50

Reliability Of The Tool

The Cronbach's Alpha value of 0.77 indicates that the tool is reliable. [n=22].

Estimates of knowledge score.

Knowledge scores are summarized as Median and Interquartile ranges (Q_1 , Q_3) as the data violates the normality assumption. The overall and domain-wise average score is below in Figure 3 (Supplementary Table S2).

Item analysis

Frequency distributions of the items of the questionnaire are shown in Table 2 separately for the various domains [n=658].

Table 2 Frequency and percentage of correct and incorrect responses for each question in the true/false questionnaire

Items		Frequency	Percentage (%)
Domain-1			
Q1	0	115.00	26.26
	1	323.00	73.74
Q2	0	164.00	37.44
	1	274.00	62.56
Q3	0	192.00	43.84
	1	246.00	56.16
Q4	0	81.00	18.49
	1	357.00	81.51
Domain-2			
Q1	0	184.00	42.01
	1	254.00	57.99
Q2	0	194.00	44.29
	1	244.00	55.71
Q3	0	151.00	34.47
	1	287.00	65.53
Q4	0	98.00	22.37
	1	340.00	77.63
Q5	0	98.00	22.37
	1	340.00	77.63
Q6	0	74.00	16.89
	1	364.00	83.11
Domain-3			
Q1	0	178.00	40.64
	1	260.00	59.36
Q2	0	119.00	27.17
	1	319.00	72.83
Q3	0	188.00	42.92

	1	250.00	57.08
Q4	0	129.00	29.45
	1	309.00	70.55
Q5	0	218.00	49.77
	1	220.00	50.23
Q6	0	154.00	35.16
	1	284.00	64.84
Q7	0	171.00	39.04
	1	267.00	60.96
Domain-4			
Q1	0	158.00	36.07
	1	280.00	63.93
Q2	0	106.00	24.20
	1	332.00	75.80
Q3	0	277.00	63.24
	1	161.00	36.76
Q4	0	100.00	22.83
	1	338.00	77.17
Q5	0	218.00	49.77
	1	220.00	50.23

(*0-Incorrect, 1-Correct; Q1, Q2, Q3...etc. -questions from each domain)

The percentage of correct responses among different age groups is shown in Table 3.

Table 3 Age-wise responses in the True/false questionnaire

AGE GROUP	CORRECT RESPONSE (%)	INCORRECT RESPONSE (%)
20-30	73.80	26.20
30-40	67.70	32.30
40-50	63.50	36.50
50-60	65.70	34.30

Awareness in each domain:

Figure 4 depicts the percentage of the correct answers for all the questions for each of the four domains.

Discussion

This online survey presented the public awareness of hearing health and hearing loss from 658 respondents from various districts of Karnataka. Many of the responses were obtained from individuals in the Udupi district, which accounts for around 54% of the total responses, whilst the Davangere district received fewer responses due to difficulties in collecting participants.

A link between age and awareness level in the current study was discovered. Participants between the ages of 20 and 30 were likely to answer the questions correctly (73.8%), while those aged 40 and over were the least likely to do so (63.5%).

The responses for the cleaning and treating the ear domain had the highest rate of correct answers (73.8%), while the responses for the diagnostic delay domain remained the lowest (66.7%). The study's findings demonstrate that many responses were correct (70.1%). The question about hearing rehabilitation being administered by ENTs, Audiologists, or both had the most significant correct-answer percentage (83.11%). Participants who were aware of the audiologists and ENT professions' rehabilitative services said they learned about them via other health care providers and word of mouth (Gabriel et al., 2015). An unexpected observation was made concerning the knowledge section, i.e., lack of Knowledge concerning the ringing sensation affecting one's daily activities. Most participants (36.76%) were not aware of the existence and impact of tinnitus (Bagwandin & Joseph, 2017).

Lack of public knowledge about the effects of extended listening to music via earphones and recommended duration of noise exposure (50.23%) led to poor attitudes regarding the prevention of hearing loss.

The younger group gave better responses than the older population when comparing the findings. The results revealed that the public had a decent understanding of hearing problems. However, numerous critical concerns with early detection and prevention of hearing loss were inadequate. Almost 73.74% of participants correctly stated that hearing loss might be diagnosed shortly after birth when asked about their Knowledge of infant hearing loss, whereas only 56.2% were aware of the availability of specialized audiological services for a hearing evaluation. However, it was noted that about 77.63% of the individuals responded correctly about the need for correct fitting of hearing aid for maximum benefit.

However, early detection and effective management of hearing impairment (e.g., hearing aids and aural rehabilitation) may influence the quality of life of individuals with hearing loss (Olusany et al., 2014). In coastal Karnataka, putting oil to cure an itching ear or an ear infection is also believed to be a common practice (Dosemane et al., 2015). Participants were aware of the risks associated with cotton earbuds and ear infections.

According to qualitative research conducted in India on healthcare personnel and parents of afflicted children, parents were less likely to recognize delayed speech or any other communication disorder in their children which would be affecting their school performance, even if they were well educated in other subjects (Merugumala et al., 2017). However, in our study, 81.51% of individuals knew how hearing loss could affect a child's school performance.

Many studies have shown associations between elderly deafness, especially if untreated, and diminished physical ability and activity (Chen et al., 2014), life satisfaction (Solheim et al., 2011), quality of life (Kelly & Atcherson, 2011), and mortality (Karpa et al., 2010). Similarly, our study discovered a dearth of awareness concerning the relationship between hearing loss and behaviour in the elderly (50.23%).

On the other hand, education is also a crucial factor that impacts the awareness level among individuals (Merugumala et al., 2017). Individuals with a high level of literacy (> bachelors-82.5%) among the total participants showed a higher rate of correct responses in the True/False questionnaire (72.8%), and individuals with poor literacy (2.4%) showed the lowest rate of correct responses (53.1%). However, our study did not have any significant difference with the same. Studying the influence of education level would also have implications for estimating awareness in small towns and rural areas.

Furthermore, because the study was carried out through an online platform, the age distribution of the data was biased toward younger individuals, which might impact the accuracy of our estimations of awareness.

Finally, the association concerning the occupation (medical or non-medical) was not carried out since there was no equal distribution among the responses obtained. Studies that include medical individuals and a more representative number of non-medical individuals and their families might clearly show how awareness distribution can be among them. Hence, there is a need to accurately assess the effect of awareness on hearing health.

In conclusion, the questionnaire seemed to be an easy and feasible tool; the results obtained in this study were generally positive. Moreover, it will be essential to continue developing more comprehensive hearing conservation programs focused on the early identification of hearing problems and early infant hearing loss identification, as well as noise exposure prevention.

Conclusion

Hearing loss may affect anyone, although it is less often known and discussed than other disabilities. Hearing loss affects almost everyone at some time in their lives, directly or indirectly, via someone they know. Hearing health awareness and early detection of hearing problems are two of the most under-addressed medical issues in the world. As a result, it is essential to build awareness so that individuals of all ages may learn about their hearing health and take steps to ensure that it remains at its best.

In our study, there is a lack of understanding about ringing sensation and its impact on an individual's daily activities. The usage of cotton buds, with the mistaken belief, that it is beneficial. The medical recommendation against cleaning one's ears is not well understood. As a result, it is suggested that health education for both urban and rural populations focus on ear hygiene, including why cotton buds should not be used.

There was a lack of public understanding about the risks of physical agents, particularly slaps/hits to the ear, which can cause hearing loss. Furthermore, it was surprising to discover that most people were unaware of tables recommending a reduction in exposure duration to high-intensity noises. It is feasible to conclude that a lack of understanding of the hazards of noise exposure might lead to higher exposure. Hence these findings support the need for noise reduction informative initiatives.

Similar studies should be carried out in several other scenarios to assess the level of Knowledge necessary to avoid preventable hearing and balance problems.

In conclusion, this audiological questionnaire appeared to be a simple, practical, and reliable tool; the results obtained in this study were generally positive; additionally, more comprehensive hearing conservation programs focusing on hearing aid management and early infant hearing loss detection, as well as noise exposure prevention, will be necessary to continue developing.

Strengths And Limitations

The study's strength is that the data collected is not concentrated on a single region; instead, it was distributed across several districts. The survey data, with a sample size of 658 respondents, does, however, provide an estimated clear picture of hearing health and hearing loss awareness.

The responses were skewed toward younger participants. Hence the results were insufficient to generalize to the entire population.

Future Research

To obtain better clarity and to analyze a better awareness among the population, it would be best if the study could be carried out across the entire country rather than state-wise. Future research should also explore variables such as the difference in awareness between rural and urban areas and between the medical and non-medical populations.

Declarations

Ethics approval

Due permission was taken from the author to use the questionnaire before the study. With due clearance from Institutional Research Committee, Kasturba Medical College and Kasturba Hospital Institutional

Ethics Committee of Kasturba Medical College, Manipal, India (registration number IEC - 436-2021), and CTRI approval (CTRI/2021/09/036988) was taken.

Consent to participate

Participation in the study was contingent upon providing informed consent. Only participants who had read the study information and informed consent electronically could participate in the study.

Consent for publication: NA

Availability of data and material: Contact the corresponding author to obtain access.

Competing interests: None

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Authors' contribution: Both authors substantially contributed to this manuscript. JC generated the research question, conceptualized and designed the study, analyzed and interpreted the data, and drafted the article. BG contributed to the design of the study, data interpretation, and reviewing and editing of the manuscript draft. Both authors gave proofreading and approval.

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Figures

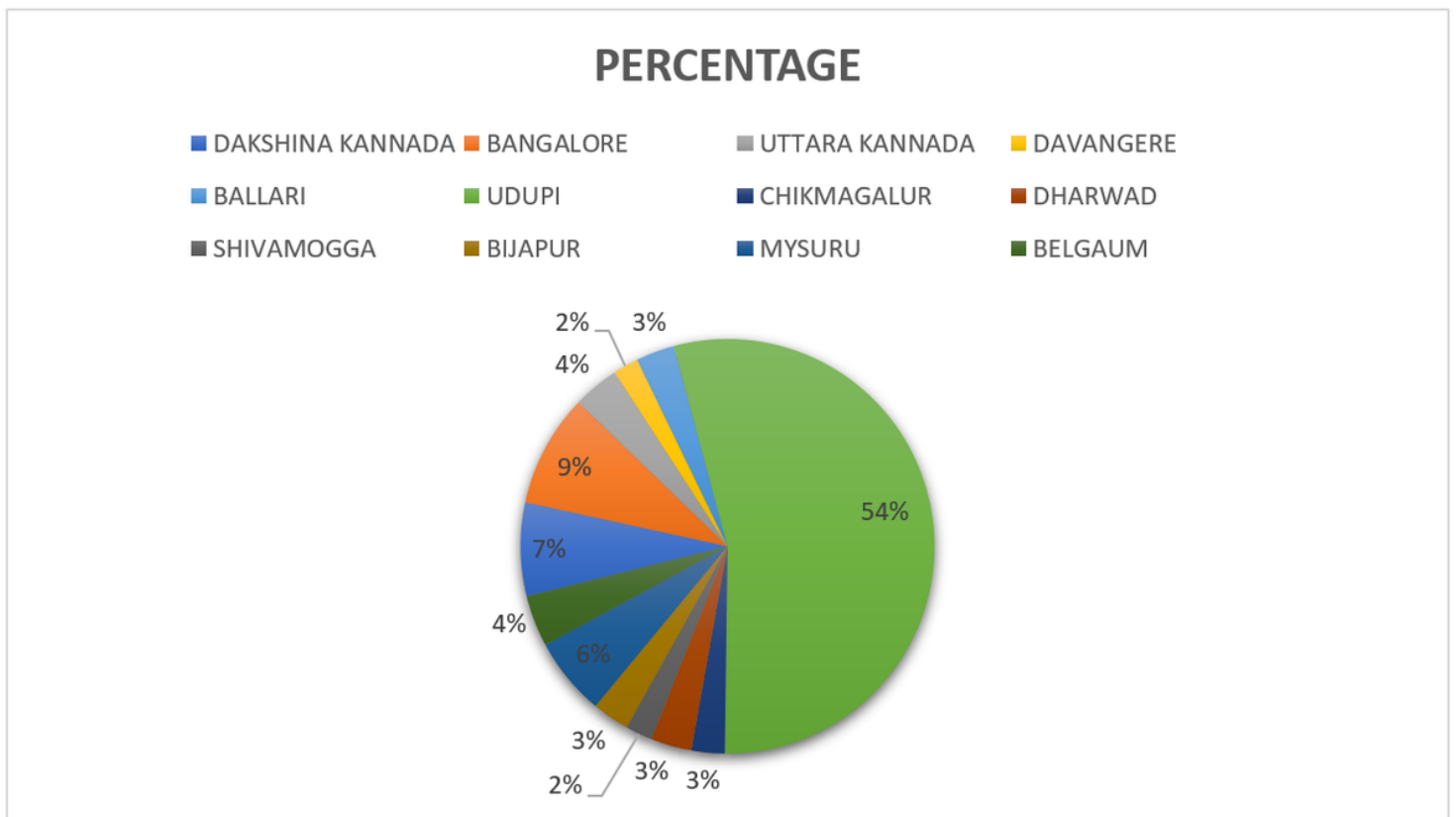


Figure 1



responses obtained among the different districts

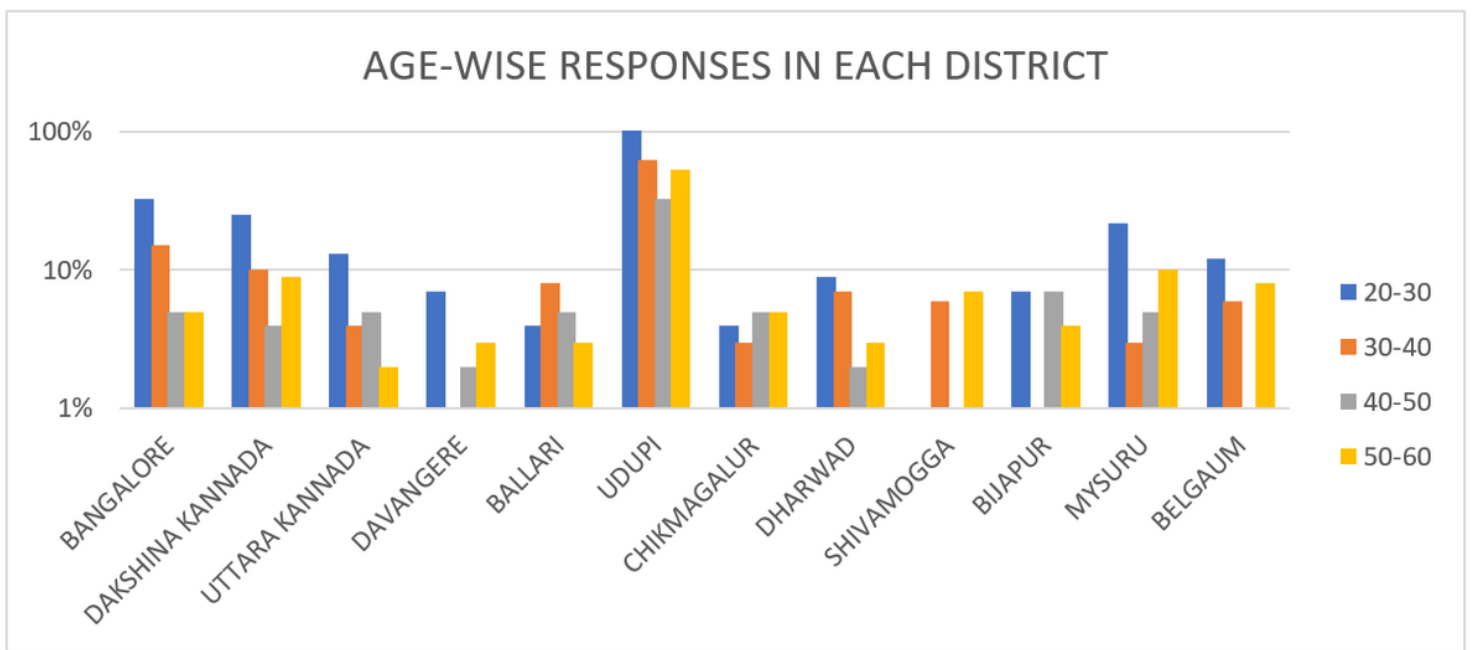


Figure 2

Age-wise responses obtained from each district

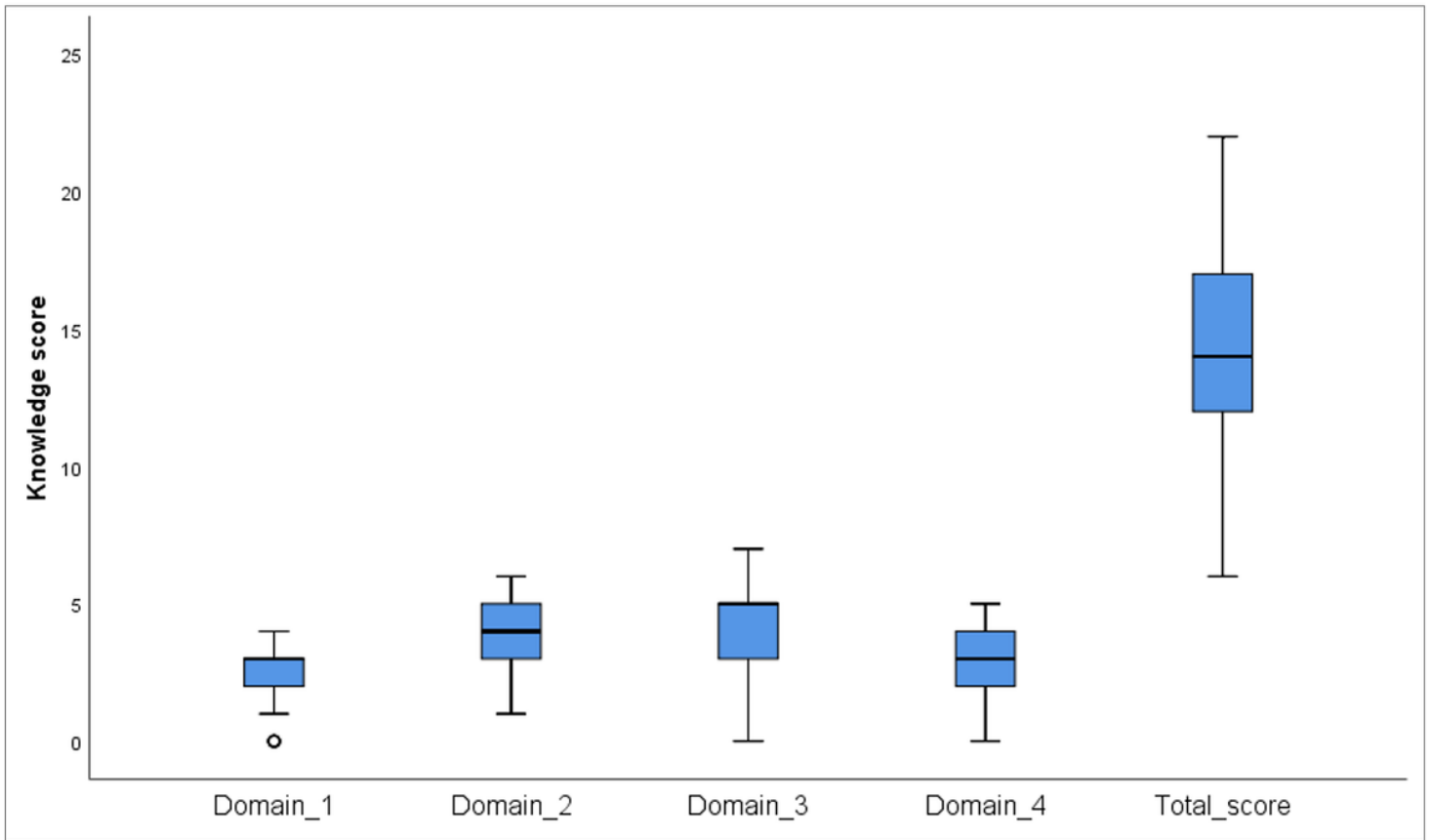


Figure 3

Knowledge score in each domain

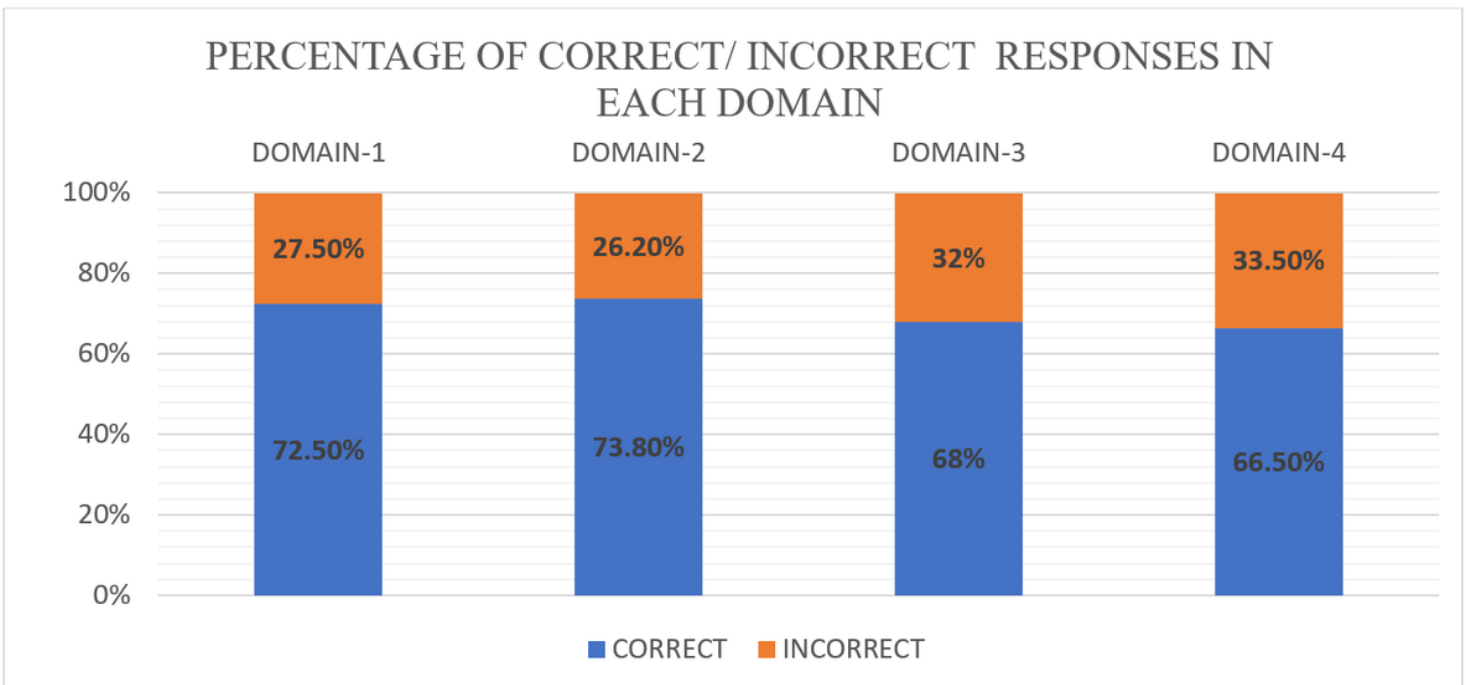


Figure 4

Percentage of correct responses in each domain

Supplementary Files

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