

## Empirical Studies Assessing the Perceptions and Knowledge of Medicine in Mongolia: A Nationwide Population-Based Study

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### ABSTRACT

The availability and affordability of medicine is an essential issue in any population globally, and drug regulatory agencies need the information to prevent an unforeseen matter and take necessary decisions by relevant agencies so that medicine will be available at an affordable price. Moreover, it is also essential to assess the consumer perception of patterns and knowledge about medicine use, subject to perception bias and belief bias. The current study examines consumers' perceptions of medicine availability, medicine spending, affordability of medicine, patterns and knowledge of medication use. A nationwide cross-sectional study was performed in Mongolia. The survey consists of nineteen closed-ended questionnaire items. The manuscript has presented according to The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines on the cross-sectional study. A total of seven thousand five hundred and thirty-two (n=7532) had participated in the study. The average spending of medicine per month in Mongolia is 4.00 USD-17.00 USD/= per month. A large percentage of the population (47.8%) has skipped buying prescription drugs due to affordability issues. 47.4% of the population believe that the price of the drug sold in the market is expensive. A surprisingly 56% of study population indicate that the pharmacy does not have enough type and stock of drug. The study population (40.4%) does not have enough awareness about falsified medicine, and 30.4% cannot buy discounted medicine covered by the health insurance fund. A considerable percentage of the population (74.2%) take medicine according to doctor instructions and is firmly in favour of the government to regulate the drug prices (79.9%).

**Keywords:** Mongolia, Population-based study, Medicine, Perception, Knowledge

### INTRODUCTION

Migration from the countryside to the city is becoming a massive problem for the Mongolian state. Mongolia's health system has faced a challenging in-migration to Ulaanbaatar, which is a big threat of rural and in-migrant urban populations. Migration has immensely increased hospitals and healthcare facilities' workload because now people do not have just a simple medical condition, but often severe, complicated conditions (Lindskog, 2014). The total population of Mongolia as of 2020 is estimated to be 3.3 million people (Mongolia, n.d.)(Baatarkhuu *et al.*, 2018).

The Mongolian government has laid the foundation in achieving universal health coverage (UHC) through Mongolian Health Sector Strategic Master Plan (2006-2015) (Erdenee *et al.*, 2019). UHC was the part of World health organisation (WHO) program under Sustainable Development Goals (SDG) which was approved by the United Nations (UN) General Assembly in September 2015 (World Health Organization., 2015) (*UN. Sustainable Development Goals*, 2015). Several countries such as Canada, Australia, Japan, New Zealand, and China have already adopted UHC.

One of the primary goals of the Mongolian health system is to defend its population of financial difficulties caused by health care costs (Dorjdagva *et al.*, 2021). The Mongolian health sector is governed by the Ministry of Health (Dorj *et al.*, 2017). Mongolia currently health expenditure has declined from 4.424% (2016) to approximately 3.788% (2018) of the country's gross domestic product (GDP). Health expenditure is counted as lowest in 2011 (3.586%) (*Current Health Expenditure (% of GDP)*, n.d.).

Mongolia is one of the developing nations in World (Miller, 2019). One of the primary challenges in providing excellent health care in developing nations is the availability of low-quality and falsified pharmaceutical goods (Caudron *et al.*, 2008)(Newton *et al.*, 2010). For a healthy nation, personal health literacy, awareness about falsified medication is critical. Personal health literacy is the degree to which individuals can find, understand, and use information and services to inform health-related decisions and actions for themselves and others (*What Is Health Literacy?*, 2021). A study found that health literacy is an important indicator to provide personalised care in diseases such as cancer (Munkhtogoo *et al.*, 2021). The literature review had shown a high drug cost in Mongolia with existing government regulations (Chimedtseren, 2012)(Dorj *et al.*, 2013). The objective of the current study aimed to investigate consumers' perceptions towards awareness on medicine availability, medicine spending, affordability of medicine, patterns and knowledge of medication use.

## MATERIALS AND METHODS

### Study population

The current research involves a descriptive cross-sectional study among the generalised population in Mongolia. The study was reported following the STROBE statement for cross-sectional study (von Elm *et al.*, 2014). The research was conducted in all provinces of Mongolia (i.e. Arkhangai, Bayankhongor, Bayan-Ulgii, Bulgan, Darkhan-Uul, Dornod, Dornogovi, Dundgovi, Govi-Altai, Govisumber, Khentii, Khovd, Khuvsgul, Orkhon, Selenge, Sukhbaatar, Tuv, Umnugovi, Uvs, Uvurkhangai, Zavkhan, Ulaanbaatar). The study's objective involves assessing the quality, availability, and cost of medicine to improve the pharmaceutical services in Mongolia.

### Data Collection

The participants have completed the survey between March 31 2021, and June 2 2021. The questionnaire has been distributed through social media, shared by the medicine and medical devices regulatory agency's official Facebook page and popular news websites of Mongolia (<https://www.montsame.mn/en/> and <https://gogo.mn/>) and phone (SMS by the mobile phone operators named Unitel, Gmobile and Skytel). The researcher has anonymously collected the information and has not collected any personal information. The total number of a response collected is seven thousand five hundred and thirty-two (n=7532). The number of responses has decreased to five thousand nine hundred and sixty-four (n=5964) after data cleaning, removing incomplete responses. For this study, we included respondents from a general population of all ages and gender in Mongolia. The participant requires two (2) minutes to complete the questions. There were nineteen (n=19) closed-ended questions in the study. All questions were designed intuitively. The questionnaire consists of socio-demographic characteristics, quality of medicine, price of medications and accessibility of medicine in Mongolia. No ethical approval was required for this study. Data were stored on a secured laptop and only allowed authorised personnel access.

### Statistical Analysis

All data entry and the basic summary of the data were conducted using SPSS version 28. Descriptive data were summarised using frequencies and percentages. Statistical analyses of variables were conducted using the Pearson Chi-Square test using Monte Carlo Significance at a 99% confidence level because of the large dataset. The Monte Carlo method provides an unbiased estimate of the exact p-value without the requirements of the asymptotic method.

## RESULTS AND DISCUSSION

The 72.3% respondents of nationwide distribution (Table I) of the respondent were from Ulaanbatar, followed by Dornod (2.9%), Umnugovi (2.2%), Dornogovi (2.1%), Darkhan-Uul (2.1%), Khuvsgul (1.8%), Orkhon (1.7%), Zavkhan (1.7%), Uvurkhangai (1.7%), Bayankhongor (1.3%), Khovd (1.2%), Uvs (1.1%), Tuv (1.1%), Selenge (1.0%), Khentii (0.9%), Bulgan (0.9%), Bayan-Ulgii (0.8%), Govi-Altai (0.7%), Sukhbaatar (0.7%), Dundgovi (0.6%) and Govisumber (0.3%) respectively.

Table I. National Wide Distribution of the Respondents

Cities/Provinces	Number (N)	Percentage (%)
Ulaanbaatar	4311	72.3
Arkhangai	53	.9
Uvurkhangai	100	1.7
Bayankhongor	78	1.3
Bulgan	51	.9
Khuvs gul	109	1.8
Orkhon	104	1.7
Bayan-Ulgii	46	.8
Zavkhan	104	1.7
Govi-Altai	44	.7
Uvs	66	1.1
Khovd	72	1.2
Govisumber	19	.3
Darkhan-Uul	123	2.1
Dundgovi	35	.6
Dornogovi	127	2.1
Umnugovi	134	2.2
Selenge	61	1.0
Tuv	64	1.1
Sukhbaatar	39	.7
Khentii	54	.9
Dornod	170	2.9
Total	5964	100.0

The demographics of respondents was presented with frequency and percentage (%) (Table II). The ages of the respondents ranged from 15 to 70 plus. The highest number of response were received from age range 30-34 year 971 (16.3%), followed by age range 35-39 year 828 (13.9%), age range 40-44 year 697 (11.7%), age range 45-49 year 667 (11.2%), age range 25-29 year 649 (10.9%), age range 50-54 year 627 (10.5%), age range 55-59 year 451 (7.6%), age range 20-24 year 405 (6.8%), age range 60-64 year 254 (4.3%), age range 15-19 year 242 (4.1%), age year 65-69 year 117 (2.0%) and 70+ year 56 (0.9%) respectively. Female participants in this research are 72.6%, whereas the percentage of men who participated are only 27.4%. The results also indicate 28.0% of families consist of four family members, followed by five family members (21.0%). The question related to family monthly income indicates 62.6% of the respondents have up to 500,000 MNT, followed by 26.0% range (1 million- 2 million MNT) and 11.4% range (2 million or more MNT).

The results indicate that 32.4% of the study population spend only 10,000-50,000 MNT on

medicine, 28.7% spend 50,000-100,000 MNT, 20.5% spend 100,000 MNT or more, whereas 14.8% does not know how much they spend money on medicine. The results found that 3.7% of the population does not spend money on medicine. The participants are not satisfied (56.0%) with the available stock of medicine when asked about their availability.

The population is concerned about the price of medicine and has skipped buying a prescription drug because of the high price (47.8%). The respondent considers drugs expensive (47.4%) or too expensive (39.7%), making a total percentage of 87.1%. The study found that 55.4% of the population face financial hardship in purchasing the medicine. When a question asked about purchasing discounted medicine that will be covered by health insurance fund without any problem, then 33.4% of the population were unable to buy medicine because it was not covered by health insurance funds, whereas 30.4% of the population does not get discounted medicine covered by the health insurance fund.

Table II. Demographics of the Respondents

Variable		Number (N)	Percentage (%)
Age Range	15-19	242	4.1
	20-24	405	6.8
	25-29	649	10.9
	30-34	971	16.3
	35-39	828	13.9
	40-44	697	11.7
	45-49	667	11.2
	50-54	627	10.5
	55-59	451	7.6
	60-64	254	4.3
	65-69	117	2.0
	70+	56	.9
Gender	Male	1633	27.4
	Female	4331	72.6
Number of family members	1	220	3.7
	2	722	12.1
	3	1176	19.7
	4	1671	28.0
	5	1254	21.0
	6	609	10.2
	7	186	3.1
	8	79	1.3
	9	19	.3
	10	28	.5
What is your family's monthly income?	Up to 500,000 MNT	3736	62.6
	1 million- 2 million MNT	1550	26.0
	2 million or more MNT	678	11.4
	Total	5964	100.0

When a question asked from the respondent on whether they believe in the quality of medicine when they buy from the pharmacy then 51.9% are not sure about the quality of medicine they purchase, whereas 39.7% believe in the quality of medicine and only 8.4% give the response in favour of "NO". When a question has been asking from the respondent whether pharmacies are giving necessary information about the knowledge of medicine use, then 44.7% percentage of the population give response as "Some time" whereas 17.8% believe that they are not receiving the necessary information from the pharmacy when they buy the medicine from the pharmacy. The results indicate that quality of medicine (46.3%) was the most crucial parameter when buying medicine. The participant considers medicine (23.2%) more important than the name of pharmacy (6.1%) where they purchase. The study found that price (15.7%) is the secondary

importance in purchasing the medicine compare with the quality of medicine (46.3%). The results show that 25% of the study participants take four or more medications daily. The result indicates that 87% of the study population is taking at least one medicine compare with 13% of the population that does not take any medicine. The participants have some knowledge (42.0%) on falsified medicine, whereas 40.4% do not know about falsified medicine. 74.2% of respondents take medicine according to doctors' prescriptions in comparison with the recommendation by the pharmacist (17.2%). The participants (79.9%) are in favour to regulate the price of drugs by the government (Table III).

The results showed a statistically significant relationship when testing for association between gender and perception of population towards Medicine availability, Spending, Price, Patterns, Knowledge of Medication Use.

Table III. Perception of Population towards Medicine availability, Spending, Price, Patterns and Knowledge of Medication Use

Variable		Number (N)	Percentage (%)
When you buy medicine from a pharmacy, do you believe in its quality?	Yes	2366	39.7
	No	502	8.4
	Hesitate	3096	51.9
Can you get instructions for use and other necessary information from the pharmacy when you buy medicine?	Yes	2253	37.8
	No	1062	17.8
	Sometime	2649	44.4
On average, how much does your family spend on medicines per month?	10,000-50,000 MNT	1931	32.4
	50,000-100,000 MNT	1711	28.7
	100,000 MNT or more	1220	20.5
	Do not know	883	14.8
	Does not spend	219	3.7
What do you consider when buying medicine?	Quality	2763	46.3
	Price	938	15.7
	Manufacturer	1383	23.2
	Name of the pharmacy	366	6.1
	Other	514	8.6
How many types of medications do you take per month?	1	746	12.5
	2	1477	24.8
	3	1476	24.7
	4 or more	1492	25.0
	Do not take	773	13.0
Have you ever skipped to buy a prescription drug because of the price?	Yes	2849	47.8
	No	1092	18.3
	Sometimes	2023	33.9
What do you think about the price of drugs sold in market of Mongolia?	Too expensive	2369	39.7
	Expensive	2826	47.4
	Reasonable	731	12.3
	Cheap	38	.6
Does the pharmacy you visit often have enough types and stocks of drugs?	Yes	2626	44.0
	No	3338	56.0
Do you know about falsified medicine?	Yes, I know	1050	17.6
	Somewhat I know	2503	42.0
	No, I don't know	2411	40.4
Can your family buy the medicine you need without financial hardship?	Yes	1418	23.8
	No	1241	20.8
	Sometimes cannot	3305	55.4
Can you buy discounted medicine covered by the health insurance fund without any trouble?	Yes	859	14.4
	No	1812	30.4
	Sometime	1303	21.8
	Do not buy medicine covered by the health insurance fund	1990	33.4

Table III Continue

Variable		Number (N)	Percentage (%)
How do you choose the medicine to take?	According to the doctor's instructions	4427	74.2
	According to the recommendations of a pharmacist	1025	17.2
	According to advertisements in the social media	163	2.7
	As suggested by others	138	2.3
Is government involvement needed to regulate drug prices?	Yes	4764	79.9
	No	419	7.0
	Do not know	781	13.1
Have you ever read the instructions for drugs registered in Mongolia on the Licemed website	Yes	990	16.6
	No	4974	83.4
	Total	5964	100.0

When a question asked by the respondent, "Have you ever read the instructions for drugs registered in Mongolia on the "Licemed" website?" then the results showed a statistically significant relationship between gender and question, therefore rejecting the null hypothesis (chi square=46.179, df=1, p<.001). A statistically significant relationship was observed between gender and how do participants choose the medicine to take? (chi square=30.773, df=4, p=0.000). The results, therefore, will reject the null hypothesis. Similar statistical significant results were observed when understanding the co-relationship between gender and questions such as "Can your family buy the medicine you need without financial hardship?" (chi square=26.228, df=2, p=0.000); "Do you know about falsified medicine?" (chi square=25.513, df=1, p=0.000); "Does the pharmacy you visit often have enough types and stocks of drugs?" (chi square=26.130, df=1, p<.001); "Have you ever skipped to buy a prescription drug because of the price?" (chi square=26.006, df=2, p=0.000); "What do you consider when buying medicine?" (chi square=24.501, df=4, p=0.000); "Can you get instructions for use and other necessary information from the pharmacy when you buy medicine?" (chi square=17.649, df=2, p<.001); "When you buy medicine from a pharmacy, do you

believe in its quality?" (chi square=41.996, df=2, p=0.000); "On average, how much does your family spend on medicines per month?" (chi square=23.524, df=4, p<.001). However, there is no relationship observed between gender and questions such as "How many types of medications do you take per month?" (chi square=15.505, df=4, p<.003) and "What do you think about the price of drugs sold in market of Mongolia?" (chi square=6.723, df=3, p=0.084), therefore, accepting null hypothesis

The current paper reports findings from empirical studies assessing the perceptions and knowledge of medicine in Mongolia. A Nationwide Population-based study was carried out and focus upon the perception, pattern, knowledge and cost of drug use in Mongolia. A large study population (51.9%) are not sure about the quality of medicine when they buy from the pharmacies in Mongolia, whereas only 39.7% of the population believe in the quality of medicine when they buy from the pharmacies. Interestingly, 42.0% of the population has some knowledge about falsified medicine, whereas 40.4% are unaware of what falsified medicine is about. From these two questions, the researchers believe that 39.7% of the population who believe in the quality of medicine could be their misperception as most of the medicine available in Mongolia has been imported from the

Russian Federation, eastern European countries, China, and India (Dorj *et al.*, 2017). The survey indicates that the majority of the study population has either little or no knowledge about falsified medicine, so population who believe in the quality of medicine could not be specific and need further verification from face to face qualitative interviews from the participant to determine their knowledge of participants on the definition of quality of medicine or what they consider as the quality of medicine when buying from the pharmacies. A similar result was observed in awareness of falsified medicine in Lebanon, where (46.4%) of participants were not aware of falsified medicine (Noun *et al.*, 2021). A cross-sectional study on collected essential medicines from the pharmacy outlets in Mongolia indicates a high prevalence of falsified medicine (Khurelbat *et al.*, 2020).

The participants received sometime instructions, other necessary information from the pharmacy, with the percentage of 44.4% whereas 17.8% of the study population had given their verdict as "No". 37.8% of the population agree on getting necessary instructions and information from the pharmacy which shows a fair percentage of the population have been satisfied with the services provided by the pharmacies in Mongolia. However, further investigation is necessary to assess the quality of pharmaceutical services given by pharmacists and questions such as prescription evaluation on completeness and accuracy; pharmacist's skills, pharmacist advice on minor treatment, appropriate labelling with instructions and general advice on healthy lifestyle (Teni *et al.*, 2015)(Kim *et al.*, 2021). The researchers recommended evaluating further using Pharmacy Services Questionnaire developed by Larson (Larson *et al.*, 2002), Kamei 26-item scale (Kamei *et al.*, 2001) or Kim *et al.*,(Kim *et al.*, 2021) 23-item scale to understand the relationship between pharmacy services and patient satisfaction.

When the participants asked about their average spending of medicine per month, 32.4% had chosen the option between 10,000-50,000 MNT (Mongolian Tugrik) (USD 1 = 2850 MNT), which is roughly around 4.00 USD to 17.00 USD per month. The average spending of medicine from private hospitals in Malaysia is RM296.98 per month, whereas private pharmacies were average around RM135.20 (USD 1 = 4.22 RM). The expenses are roughly double compared to consumer spending in Mongolia, around 32.00 USD and 70.00 USD per month in private pharmacies and private hospitals, respectively (Mohamad Azmi H, 2012).

Another study confirms 88.4% of respondents spend USD 14.70 per month on medicine in Penang, Malaysia (Al-Gedadi *et al.*, 2008). 47.4% and 39.7% of the study population had mentioned that prices of drugs in Mongolia are expensive or too expensive, respectively. 47.8 % of the population had skipped buying a prescription drug because of the price.

The result indicates that only 2.7% of the participants take medicine, according to the advertisement in social media. 74.2% follows doctor's instructions in taking medicine compare with the pharmacist (17.2%). The population follows the instruction given by doctors shows trust in doctors in the health care structure of Mongolia.

The study was conducted online due to the COVID-19 pandemic situation and unable to perform face to face data collection. Face to face method can avoid misunderstanding of questions (Gammie *et al.*, 2016). A large number of data was collected from the capital city of Ulaanbaatar (72.3%), whereas (27.7%) were collected from the other provinces. Ulaanbaatar is the most densely inhabited city of Mongolia, with around 1.597 million (2020). The current study investigates the perception and knowledge about medicine among the general population in Mongolia; however, it does not determine the precise perception of medicine among the specific population (i.e. physician, pharmacist, nurse, patient).

Moreover, the questionnaire used in the current study has not been validated. The reliability and validity of the questionnaire could be performed if the items were adopted from different factors in the systematic and structural method by appropriate literature review. The questionnaire design is written in broad context and needs further studies to understand questions related to cost of specific medicine, perception about pharmaceutical services, and knowledge related to generic and brand name medicine in Mongolia. Furthermore, there is a need to evaluate the perception of consumer satisfaction from different community pharmacies in Mongolia. A study should be conducted in twenty one (n=21) provinces of Mongolia in different pharmacies by random allocation sequence and using validated questionnaire. The current study is a cross-sectional one in which the researcher had measured at the same point in time. However, consumer behaviour may change with time. Therefore, a longitudinal three-wave study may help to solve the problem.

## CONCLUSION

The current finding suggests that more than half of the study population is hesitant about the quality of medicine when they purchase from the pharmacy. The population considers medicine as expensive, lacks enough stock in the pharmacies, and sometimes faces financial hardship in purchasing from the market. The consumer is not completely satisfied regarding instructions for use and other necessary information provided by the pharmacy when they buy medicine. The population strongly suggest that government must involve in regulating drug prices. Poor supply of high quality and affordable drugs can be a breeding ground for falsified drugs. Therefore, there is a need to ensure the quality of drugs on the market by improving the drug registration process and to strengthen the foundation for affordable drugs by establishing a system to regulate drug prices in accordance with relevant laws and regulations. It is important to continuously implement public awareness campaigns on the rational use of drugs as well as falsified and substandard drugs in a way that is accessible to the public.

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## CONFLICT OF INTEREST

"The authors declare no conflict of interest".

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