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Research Article

Association Between Demographic Characteristics of Users' and Overall Satisfaction with Water Supply Service

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Abstract

Water constitutes an indispensable resource for various aspects of daily life, encompassing essential needs such as drinking, cooking, sanitation, and irrigation. Beyond household applications, diverse livelihood activities, including livestock management, gardening, crop cultivation, food processing, aquaculture, and fisheries, also rely on water. The assessment of customer satisfaction holds paramount significance in driving performance enhancements for service providers, even within government-owned entities offering critical services like water supply. This research aims to scrutinize the interplay between overall satisfaction with water services and its determinants, including satisfaction with water quality, and various parameters such as water supply hours, tap pressure, supplied water quantity, management responsiveness and communication, and water tariff. Anticipatedly, water supply hours, quantity, and quality are expected to exert a crucial influence on user satisfaction. Although users express a satisfaction level above neutral, it falls short of reaching a fully satisfactory level. Key contributors to user satisfaction involve aspects such as water supply hours, pressure, quantity, and quality, while complaints about water supply yield slightly lower satisfaction. Satisfaction with water service hours, quantity, and quality emerges as a driving force for overall satisfaction. The analysis reveals no significant association between overall satisfaction and demographic variables such as occupation, gender, age, education, and the main income source. However, a noteworthy association exists between satisfaction with water pressure and the water collection method, and a robust link is observed between satisfaction with water quality and respondents' water treatment practices. The provision for complaints is significantly associated with satisfaction regarding management responsiveness and communication. Multiple regression analysis underscores a positive relationship between overall satisfaction with water services and satisfaction with water quality and supply hours, indicating that higher satisfaction with these factors enhances overall satisfaction with water services.

Keywords

Association, Determinants, Satisfactions, Water Services, Demographic Variables

1. Introduction

Customer satisfaction research is crucial for pushing service providers to perform better. This holds even for businesses that are owned by the government, such as those that deliver basic services like water delivery. Water is a fundamental human requirement and right. Water is essential for meeting people's daily needs, such as irrigation, cooking, drinking, and sanitation. In addition to household use, people require water for a variety of other uses, such as aquaculture,

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fisheries, gardening, crops, cattle, and food processing. Water is essential to life in developing countries rural and pre-urban settings where agriculture is the primary industry. Water is essential for both sustaining life and good health. But there are issues with water scarcity all around the planet. Due to the lack of water, individuals were compelled to utilize contaminated water for drinking and other household needs. There is little or very little motivation to guarantee customer pleasure because of the monopolistic character of the firms. Government-owned businesses prioritize less customer satisfaction and demands since they lack a professional customer service strategy. To feel satisfied, one must have the stated good or service satisfied. Thus, the degree of satisfaction is determined by the perceived performance of a business or utility, which is an evaluation of the delivered good or service considered in light of the needs of the customers. It is usually expected that greater service quality will lead to happier customers, which will boost repeat business and income. The two elements of customer satisfaction are the customer's reaction to the fulfilled condition and the customer's assessment of the fulfilled [1]. Customer satisfaction assessment helps business organizations reach their objectives by evaluating the efficacy of the services or goods they provide, identifying areas for improvement, and learning about the priorities of their consumers. This leads to customer segmentation. It is a tool that may be used to project into the minds of the consumers and obtain ongoing, meaningful customer feedback [2]. It is an essential part of overall quality management, and it has been found that enhancing service quality has a significant impact on increasing customer satisfaction.

2. Satisfaction with the Water Supply System

Acceptance and preference are directly related to consumer pleasure. The satisfaction of a stated need for a good or service is the fulfillment and satisfaction of that demand. Thus, the degree of satisfaction is determined by the perceived performance of a business or utility, which is an evaluation of the delivered good or service assessed in light of the needs of the consumers. Customer satisfaction is defined as the customer's reaction to the fulfilled condition and their assessment of the fulfilled. It's a tool for putting oneself in the client's position and getting valuable, continuing feedback from customers [3]. It is also a crucial component of total quality management. It was discovered that raising customer satisfaction required raising service quality. Unsatisfactory customer service may cause a reluctance to pay bills. Additionally, it can make customers reluctant to pay higher water rates and impact their willingness to do so. Reliable water supply at the right pressure, high-quality water, prompt and accurate billing, responsiveness to general questions and complaints, ease of setting up new connections, ease of paying bills, proper customer care behavior, frequent updates on services, and a welcoming office environment are some features that boost customer satisfaction [4]. Acceptance and preferences were directly related to consumer satisfaction. A 2006 study on customer satisfaction in the Gaza Strip by Al-Ghuraiz and Enshassi found that increasing customer happiness mostly depends on the caliber of the services provided. Furthermore, a scarcity of water or an inconsistent supply of water leads to disagreements between users and the water supplier, which lowers income.

2.1. Level of Satisfaction

The satisfaction of a demand for an item or service is the result of that need being met. Thus, the degree of satisfaction is determined by the perceived performance of a business or utility, which is an evaluation of the delivered good or service assessed in light of the needs of the consumers [5]. The majority of the approaches water utilities now utilize to gauge customer satisfaction do so with previous results. The measurements ask about prior experiences and opinions regarding prior or, at the very least, present water utility policies and procedures. There are many customer satisfaction surveys in the literature, but sadly many of them lack any kind of framework that would show the underlying presumptions that underlie the questions [6]. Too frequently, specialists rather than customers determine the issues that are the focus of the survey questions. There is no assurance that the concerns listed by experts as critical customer satisfaction factors are also the ones that the consumer finds most compelling [7]. Take the design of new customer information systems, which was based on employee interviews with the utilities. The outcomes can be contrasted with those of management team-completed employee satisfaction surveys. Numerous studies, however, falsely claim to have examined customer satisfaction levels when they measured a set of characteristics that experts have described. Experts are likely to have a different perspective on "their" product or services than laypeople because they can be assumed to have more in-depth and broad expertise. As a result, topics that experts deem important and favored may not coincide with consumer priorities and preferences. An industry's competitive position is now largely determined by customer satisfaction, and businesses can only survive if their target market is prepared to pay for their goods or services [8]. The increasing competition in the nonprofit and for-profit sectors of the economy is pressuring businesses and organizations to embrace customer-centered management and give greater priority to meeting the needs of their consumers. To provide outstanding customer service in a company or organization, one must be able to hear the client's voice and understand their needs and beliefs. Customer satisfaction measurement is therefore a crucial aspect of customer service and service quality.

2.1.1. Satisfaction Level of Hours and Timing of Water Supply

The availability of water is frequently limited to a few hours per day or a few days per week in many poor countries, although it is a given in the majority of affluent nations. According to estimates, almost half of the people living in underdeveloped nations only have access to water sometimes. The national urban water supply and sanitation sector policy from 2009 is based on the daily supply duration, continuity for various levels of service, and its dependability. For high and medium-level services, water supply should last 24 hours per day, compared to 4 hours per day for basic-level services, and all levels of service should be continuous throughout the year.

2.1.2. Satisfaction Level of Quantity of Water Supply

The quantity of water provided and used by families is a crucial aspect of residential water supply, as it affects hygiene and public health. Standards for water delivery amounts have been suggested for a few special cases. The initiative notes that meeting the minimum criteria for disaster relief requires each person to use 15 liters of water per day [9]. Estimates of the needs of lactating women who participate in moderate physical activity in above-average temperatures indicate that an average of 7.5 liters per individual per day will be adequate to fulfill the needs of most people in most conditions. This water's quality needs to show a reasonable level of risk [8]. However, a minimum of 15 liters is needed in an emergency. To meet minimum hygiene requirements and provide basic food hygiene, a larger volume of around 20 liters per individual per day should be guaranteed. If not done at the source, laundry, and bathing may require higher amounts. The water usage for various levels of service & its dependability have been outlined in the national urban water supply & sanitation sector policy (2009). For a high level of service, the water consumption for an urban water supply system should be greater than 100 lpcd, between 45 and 100 lpcd for a medium level of service, and up to 45 lpcd for a basic level of service [10].

2.1.3. Satisfaction Level of Tap Pressure

The force that propels water through our pipes and into real estate is known as water pressure. One bar is the amount of force required to lift water via pipes to a height of 10 meters. A distribution system's various locations have differing water pressures. Every location where water enters a building or a house has a pressure reducer. Higher pressures may be used by water mains located beneath streets. In badly maintained systems, the water pressure can be so high that it ruins plumbing fixtures and wastes water, or it can be so low that it barely creates a trickle. Urban water systems are often maintained by pressurized water tanks, pumps at the water treatment plant and repeater pumping stations, or by pumping water up into a water tower and depending on gravity to keep the system pressure constant. The pressure loss brought on by the supply resistance causes the effective pressure to fluctuate even with the same static pressure. Urban consumers may have 5 meters of 15 mm lead pipe coming from the iron main, which will allow for high flow through the kitchen tap. A rural consumer's kitchen tap flow may be poor because they have a kilometer of 22 mm iron pipe that is rusty and limed [11].

2.1.4. Satisfaction Level of Quality of Water

Both a microbiological and a physico-chemical component affect the quality of drinking water. Several factors affect water quality. Water should be included in public water supply systems, at a minimum. The way water appears to the customer determines its physical quality. Physical characteristics include the water's clarity, flavor, aroma, and temperature. Water must appear clear or have minimal turbidity to have a desirable physical quality (less than 5.0 units of turbidity). To avoid drawing the consumer's attention away, the water's hue must be subdued. Less than 15.0 units of color should be used for color. When chlorine is added to the water or it is used for cooking, components that could generate taste and odor should not be present [12]. Additionally, it should be clear of organisms that cause problems, such as higher bacteria or the fragrant oils of algae. If the water is too hot, it will have a negative impact on the water's attractiveness and cause people to utilize it less. The range of the ground water's temperature is between 40 to 55 ℉ (4 to 13 ℃). Such temperature variations depend on the depth of the well and the presence of above-ground storage facilities. Around 40 to 80 ℉ (4 to 27 ℃) is the seasonal range for surface water temperatures, with considerably higher values in the deep south and southwest.

2.1.5. Satisfaction Level of Responsiveness and Communication of Management

Numerous institutions are in charge of providing water. Institutions in charge of regulation and policy are fundamentally different from organizations in charge of service delivery. Numerous countries worldwide have established regulatory bodies for infrastructure services, such as water supply and sanitation, to enhance consumer protection and optimize efficiency. Regulatory bodies may be tasked with maintaining industry information systems, such as benchmarking systems, and approving tariff increases. They occasionally also have the responsibility of resolving consumer complaints that service providers haven't handled satisfactorily. As opposed to government ministries' departments, these specialist organizations are anticipated to be more capable and impartial in policing service providers. Although regulatory bodies are meant to be independent of the executive part of government, this has not always been the case in many different nations.

2.1.6. Satisfaction Level of Water Tariff

In almost every country in the world, service providers impose tariffs to recoup some of their expenses. The average (mean) global water rate, according to World Bank estimates,

is $0.53 per cubic meter. The average tariff in affluent nations is $1.04, whereas it is only $0.11 in the poorest developing nations. South Asia has the lowest average tariffs in developing nations ($0.09/$m^3$), while Latin America has the highest average tariffs ($0.41/$m^3$) [13]. The cost is predicated on a 15 cubic meter monthly use threshold. Not many utilities can recover all of their expenses. According to the same World Bank report, just 30% of utilities worldwide and 50% of utilities in developed countries generate enough money to cover operating, maintenance, and partial capital costs. In developing countries, tariffs are usually far lower than production costs. The cost of residential water for a 15 cubic meter monthly consumption typically ranges from less than $1 to $12 [14]. Sanitation and water tariffs are usually paid separately, but they can take many different forms. In situations where meters are present, fees are usually volumetric (per usage), sometimes with an additional minor fixed monthly price. Fixed or flat prices, unrelated to actual use, are charged in the absence of meters. Tariffs in developed countries are frequently the same for different user categories and usage levels.

2.2. Description of the Study Area

One of the most densely populated areas in Nepal's mid-hills is the current Lekhnath Municipality. It is situated 6.25 kilometers east of Pokhara Metropolitan City's city center and 200 kilometers west of Kathmandu on the Prithivi Highway that links the two cities. The District Water Delivery Office (DWSO) reports that 17 gravity water delivery schemes provide water to the 294 tap stands in the municipality. According to the report of Social Works Group (SWOG), the effort ultimately benefited 9357 homes. The purpose of the two Lapsi Danda and Danda Ko Nak water supply systems, as well as the two already-existing Arghaun and Shishuwa-Khudi water supply systems, is to supply water to the residents of these projects. Wards 2 through 5's 2302 dwellings are covered by the Lapsi Danda system. The Danda Ko Nak system includes 5628 houses in Ward Nos. 1, 7-9, and 11–13. Comparably, the existing Arghaun system has covered 480 households in wards 3, 4, and 6, while the current Shishuwa-Khudi system will reach 947 homes in wards 8 and 12–15 in 2015.

2.3. Model Specification

The goal of this study is to examine the relationship between overall satisfaction with water service and factors that influence it, such as satisfaction with the quality of the water and other aspects like water supply hours and timings, tap pressure, water supply quantity, management responsiveness and communication, and water tariff [1]. However, it was anticipated that quantity, quality, and hours & timings would be crucial to consumer happiness. Thus, to analyze the link between overall satisfaction with water supply and its causes, a multiple regression model was used in this study. The multiple regression model used in this study is:

$$Oasws = \alpha + \beta1Swhtws + \beta2Swwq + \beta3Swqw + \varepsilon \quad (1)$$

Where, the dependent variable is overall satisfaction with water services as Oasws and the independent variables are satisfaction with hours and timing of water supply, satisfaction with water quantity and satisfaction with the quality of water as Swhtws, Swwq and Swqw respectively. ε is the error term, α is the intercept of the dependent variable and β1, β2 and β3 are the beta coefficients of the explanatory variables to be estimated.

2.4. Data Analysis and Presentation

Descriptive analysis, multiple regression & correlation analysis have been conducted to analyze the relationship among dependent and independent variables.

2.4.1. Background Characteristics of the Respondents

According to the total number of respondents, about 13% were between the ages of 20 and 30, roughly 38% were between the ages of 30 and 40, and the remaining roughly 49% were over the age of 40. Though the percentages of men and women respondents varied depending on the area, among the respondents above, 64% of respondents were males and 36% of respondents were women. In a similar disposition, 10% of respondents were single and 90% of respondents were married. According to the data, roughly 10% of participants lacked literacy, 21% had only completed elementary or literacy school, 39% had completed secondary school, and 30% had completed university education. To make ends meet, the respondents followed a range of careers in industries such as business, services, agriculture, and private employment. About 12 percent of respondents' families had lived less than 1 year in the house while 88 percent of respondents' families lived more than 1 year in the house. Regarding the socioeconomic status of the respondents, about 93 percent of the respondents paid water tariff monthly while 7 percent of the respondents did not pay water tariff monthly.

Table 1. *Respondents' background characteristics.*

Characteristics	Percent (No.)
Age	
20-30	12.63 (50)
30-40	37.88 (150)
40 and above	49.49 (196)
Gender	

Characteristics	Percent (No.)
Male	64.40 (255)
Female	35.60 (141)
Marital status	
Married	89.65 (355)
Unmarried	10.35 (41)
Education	
Illiterate	9.85 (39)
Primary/Literate	21.21 (84)
Secondary	39.14 (155)
University	29.80 (118)
Occupation	
Agriculture	25.75 (102)
Business	21.46 (85)
Private job	9.34 (37)
Service	17.42 (69)
Student	4.29 (17)
Housewife	5.05 (20)
Teacher	3.53 (14)
Others	13.13 (52)
The family lived in the house	
Less than 1 year	11.36 (45)
More than 1 year	88.64 (351)
Payment of water tariff	
Monthly	92.40 (366)
Non-monthly	7.60 (30)

Source: Responses on survey questionnaire

2.4.2. Social Characteristics

The social characteristics of the participants in the Lekhnath small-town water supply and sanitation project questionnaire survey have been determined. The socioeconomic characteristics of the respondents are displayed in the table below according to their household size, family income, type of roof, sources they used before the trial, and method of gathering water from pipelines. The respondents' family history may have an impact on how much water is used, demanded, and collected, and how satisfied the households are with the water services overall.

Table 2. *Respondents' social characteristics.*

Characteristics	Percent (No.)
Household member	
Less than 5	64.39 (255)
5-10	34.60 (137)
More than 10	1.01 (4)
Types of roof	
RCC	69.19 (274)
CGI sheet roof	22.47 (89)
Thatched roof	4.04 (16)
Others	4.30 (17)
Collection of water from the pipeline	
From tap	51.52 (204)
From underground tank	13.13 (52)
Both	35.35 (140)
The income source of the family	
Agriculture	27.78 (110)
Service	21.72 (86)
Business	21.97 (87)
Private job	10.86 (43)
Others	17.68 (70)
Source of water before the project	
Community-managed water supply	63.89 (253)
Spring water	8.59 (34)
River/stream/canal	5.56 (22)
Tube well	7.83 (31)
Private tap	14.13 (56)

Source: Responses on survey questionnaire

According to the results, over 64% of households had fewer than five people, around 35% of households had family members aged between five and ten, and only 1% of respondents' families had more than ten members. The primary source of income for approximately 28% of the respondents' families was agriculture, followed by more than 21% from services, more than 21% from businesses, more than 10% from private jobs, and roughly 18% from other sources of income to support their family. More than 69 percent of the respondents' home roofs were made of RCC, while more than 22 percent had CGI sheet roofing and about 4 percent of house roofs were thatched roof. Before the project, approximately 64% of the respondents' families

used a community-managed water supply, 8% or more used spring water, 7% or more used tube wells throughout the location, 14% or more used private taps, and 6% or less used rivers, streams, or canals as their primary sources of water. Thirteen percent of respondents' households obtained their water solely from an underground tap, whereas thirty-five percent of respondents' families obtained their water from both sources.

2.4.3. Level of Satisfaction with Water Supply

Several statements that represented the factors influencing the degree of user satisfaction were posed to the respondents. The statements are displayed in the table below and were created using a five-point Likert scale, with 1 denoting "strongly not satisfy" and 5 denoting "strongly satisfy."

Table 3. Level of users' satisfaction.

Categories of satisfaction	Users' satisfaction level
Satisfaction with hours & timing	3.45
Satisfaction with quantity	3.43
Satisfaction with tap pressure	3.33
Satisfaction with the quality of water	3.29
Satisfaction with responsiveness & communication of management	3.27
Satisfaction with water tariff	3.27
Satisfaction with overall water services	3.29

Source: Responses on survey questionnaire

2.4.4. Overall Level of Satisfaction with Water Supply Services

Higher levels of satisfaction with the water supply are expected to have a positive correlation with various parameters, such as water quality satisfaction and other elements like water supply hours and timings, tap pressure, water supply amount, management responsiveness and communication, and water tariff. About 41% of respondents expressed a neutral level of satisfaction with water services, indicating that they were neither satisfied nor dissatisfied, while roughly 36% expressed a high level of pleasure. The overall water services satisfaction scale was 3.29, with 5.0 representing strong satisfaction and 1.0 representing noticeable discontent. The several factors that affect user satisfaction include water supply hours and timings, tap pressure, water quantity supplied, management responsiveness, and communication and water tariff as well as redresses of customer complaints have been examined.

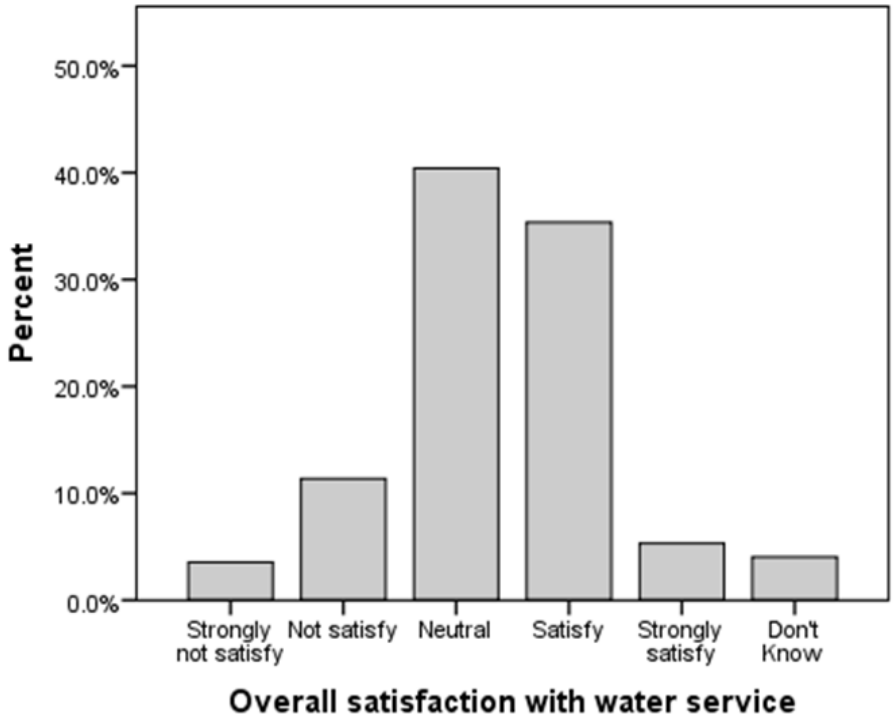

Figure 1. Percent of satisfaction with overall water services.

3. Relationship Between Overall Satisfaction with Water Supply Service

3.1. Association Between Demographic / Social Characteristics of Users' and Overall Satisfaction with Water Service

Higher levels of satisfaction with water supply are anticipated to have a positive correlation with many variables, including contentment with water quality and other aspects including water amount, water pressure, water supply hours and scheduling, and management responsiveness. Additionally, the respondents' socioeconomic and demographic traits correlate with their overall satisfaction with water services.

3.1.1. Association Between Overall Satisfaction with Water Service and Occupation of Respondents

The survey shows that about 40 percent of respondents who had an occupation in agriculture were satisfied and about 38 percent were neutral in overall satisfaction with water service. Similarly, most of the respondents who had an occupation as a business were neutral. Likewise, about 44 percent of private job holders were satisfied, among the student respondents most of them were neutral and the neutral percent of housewives were the same, most of the teacher respondents were satisfied and among other respondents, most of them were neutral in overall satisfaction with water service. A chi-square test of independence between overall satisfaction with water service and occupation of respondents had been conducted; the probability associated with chi-square statistic of 47.073 and p-value is greater than 0.05 indicating there is no association between overall satisfaction with water service and occupation of respondents.

3.1.2. Association Between Overall Satisfaction with Water Service and Gender of Respondents

The result shows that about 41 percent of male respondents were neutral and about 36 percent were satisfied in overall satisfaction with water service. Similarly, about 40 percent of female respondents were neutral and about 35 percent of female respondents were satisfied. The chi-square test between overall satisfaction with water service and gender of respondents had been done and the result shows chi-square statistics of 1.710 and a p-value is greater than 0.05 indicating that there is no association between overall satisfaction with water service and gender of respondents.

3.1.3. Association Between Overall Satisfaction with Water Service and Age of Respondents

The survey shows that among the respondents who had aged between 20 to 30 years had same percent satisfied and neutral, similarly about 39 percent of respondents had aged between 30 to 40 years were neutral and about 36 percent of respondents of the same age were satisfied. Likewise, most of the respondents of age above 40 years were neutral. The chi-square test between overall satisfaction with water service and the age of respondents was conducted and the result shows chi-square statistics of 11.964 and a p-value greater than 0.05 indicating that there is no association between overall satisfaction with water service and the age of respondents.

3.1.4. Association Between Overall Satisfaction with Water Service and Education of Respondents

The result of the study shows that among the illiterate respondents most were neutral in overall satisfaction with water service, similarly most literate/primary level respondents were satisfied and most secondary-level respondents were neutral while the neutral and satisfied percent of university-level respondents were the same. The chi-square test between overall satisfaction with water service and education of respondents was conducted; the probability associated with chi-square statistics of 20.917 and the p-value is greater than 0.05 indicating that there is no evidence of association between overall satisfaction with water service and education of respondents.

3.1.5. Association Between Overall Satisfaction with Water Service and Marital Status of Respondents

The result of the study shows that about 39 percent of married respondents were neutral and about 36 percent were satisfied in overall satisfaction with water service. Similarly, about 51 percent of unmarried respondents were neutral and about 27 percent of unmarried respondents were satisfied. The chi-square test between overall satisfaction with water service and marital status of respondents was done and the result shows chi-square statistics of 11.571 and the p-value is less than 0.05 indicating that there is a significant association between overall satisfaction with water service and marital status of respondents.

3.1.6. Association Between Overall Satisfaction with Water Service and Household Member

The survey shows that among the respondents with household member numbers less than 5, about 41 percent were neutral while about 31 percent were satisfied overall satisfaction with water service, similarly about 39 percent of respondents with household member numbers between 5 to 10

were neutral and about 33 percent of same family size were satisfy. Likewise, most of the respondents who had a family number of more than 10 were neutral. The chi-square test between overall satisfaction with water service and household members of respondents was conducted and the result shows chi-square statistics of 6.693 and a p-value greater than 0.05 indicating that there is no association between overall satisfaction with water service and household members of respondents.

3.1.7. Association Between Overall Satisfaction with Water Service and Family Lived in House

The study shows that about 42 percent of respondents who lived in a house less than 1 year were neutral and about 25 percent were satisfied in overall satisfaction with water service. Similarly, about 40 percent of respondents who lived in a house for more than 1 year were neutral and about 36 percent of respondents who lived in a house for more than 1 year were satisfied. The chi-square test between overall satisfaction with water service and the number of years respondents' family lived in the house was done and the result shows chi-square statistics of 20.382 and a p-value is less than 0.01 indicating that there is very strong evidence of an association between overall satisfaction with water service and respondents' family lived in the house.

3.2. Association Between Satisfaction of Users and Its Determinants

Higher levels of satisfaction with water supply are anticipated to have a positive correlation with many variables, including contentment with water quality and other aspects including water amount, water pressure, water supply hours and scheduling, and management responsiveness. Furthermore, other factors are associated with these metrics.

3.2.1. Association Between Satisfaction with Water Quantity and Types of Roof

According to the results, over 46% of respondents who had an RCC roof expressed satisfaction, while over 37% expressed neutrality. Comparably, the majority of respondents with thatched roofs expressed neutral satisfaction with the quantity of water in their homes, while roughly 43% of those with CGI sheet roofs expressed neutral happiness. A chi-square test of independence between satisfaction with water quantity and types of the roof of respondents' houses was conducted; the probability associated with the chi-square statistic of 30.405 and p-value is less than 0.01 indicating that there is very strong evidence of an association between satisfaction with water quantity and types of roof in respondents' house.

3.2.2. Association Between Satisfaction with Water Quantity and Source of Water Before Project

According to the study's findings, over 48% of respondents who had previously used a community-managed water supply expressed happiness with the amount of water available, while over 36% expressed neutrality. Comparably, about 34% of respondents who used spring water were satisfied, about 36% of respondents who used rivers, streams, or canals as their primary source of water before the project were satisfied, about 49% of respondents who used tube wells were satisfied, and the majority of respondents who used private taps were neutral about their level of satisfaction with the amount of water they received. The chi-square test of independence between satisfaction with water quantity and sources of water before the project used had been conducted; the probability associated with the chi-square statistic of 80.148 and p-value is less than 0.01 indicating that there is very strong evidence of an association between satisfaction with water quantity and sources of water before project used.

3.2.3. Association Between Satisfaction with Hours and Timings of Water Supply and Times of Water Supply in a Day

According to the results, over 62 percent of respondents had no opinion, and over 20 percent expressed dissatisfaction with the timing and hours of water supply when water was only provided once. The majority of respondents expressed satisfaction when water was delivered twice or more during the day, along with the specific hours and timings of the supply. A chi-square test of independence between satisfaction with hours and timings of water supply and times of water supply in a day had been conducted; the probability associated with the chi-square statistic of 49.573 and p-value is less than 0.01 indicating that there is very strong evidence of an association between satisfaction with hours and timings of water supply and times of water supply in a day.

3.2.4. Association Between Satisfaction with Hours and Timings of Water Supply and Hours of Water Supply in a Day

Regarding the hours and timings of the water supply—between one and three hours per day—more than 45 percent of respondents expressed no opinion, whilst almost 42 percent expressed no opinion at all. The majority of respondents expressed satisfaction with the hours and timings of the water supply, which ranged from three to six hours each day. In a similar vein, the majority of respondents had no opinion when water was provided continuously, but dissatisfaction when it was provided every other day. A chi-square test of independence between satisfaction with hours and timings of water supply and hours of water supply in a day had been conducted; the probability associated with

chi-square statistic of 29.547 and p-value is less than 0.01 indicating that there is very strong evidence of an association between satisfaction with hours and timings of water supply and hours of water supply in a day.

3.2.5. Association Between Satisfaction with Tap Pressure and Method of Collection of Water

About 46% of respondents who collected water from the tap expressed satisfaction, compared to 40% who expressed neutrality about tap pressure. Similarly, 68% of respondents who collected water from an underground tank expressed satisfaction, and the majority of respondents who collected water from both sources expressed neutrality. The chi-square test between satisfaction with tap pressure and the collection method of water was conducted and the result shows chi-square statistics of 33.089 and the p-value is less than 0.01 indicating that there is very strong evidence of an association between satisfaction with tap pressure and collection method of water from pipeline.

3.2.6. Association Between Satisfaction with Water Quality and Water Treatment by Respondents

While the majority of respondents were neutral and treated water frequently or occasionally before drinking, almost 40% of those who always treated the water before drinking were satisfied with the quality of the water. A chi-square test of independence between satisfaction with water quality and water treatment by respondents had been conducted; the probability associated with the chi-square statistic of 20.461 and the p-value is less than 0.01 indicating that there is very strong evidence of association between satisfaction with water quality and water treatment by respondents.

3.2.7. Association Between Satisfaction with Responsiveness & Communication of Management and Provision for Complaint

According to the study, roughly 47% of respondents who were aware of the water service management complaint provision were satisfied with management's responsiveness and communication, while roughly 47% of respondents who were unaware of this provision expressed neutral satisfaction with management's responsiveness and communication. A chi-square test of independence between satisfaction with responsiveness and communication of management and provision for complaint had been conducted; the probability associated with chi-square statistic of 40.402 and p-value is less than 0.01 indicating that there is very strong evidence of association between satisfaction with responsiveness and communication of management and provision for complaint.

3.2.8. Association between Satisfaction with Responsiveness & Communication of Management and Provision for Complaint

Research indicates that roughly 47% of participants who were aware of the water service management complaint provision were satisfied with management's responsiveness and communication, while roughly 47% of participants who were unaware of this provision expressed neutral satisfaction with management's responsiveness and communication. A chi-square test of independence between satisfaction with responsiveness and communication of management and provision for complaint had been conducted; the probability associated with chi-square statistic of 40.402 and p-value is less than 0.01 indicating that there is very strong evidence of association between satisfaction with responsiveness and communication of management and provision for complaint.

3.2.9. Association Between Satisfaction with Water Tariff and Average Water Tariff Per Month of Respondents

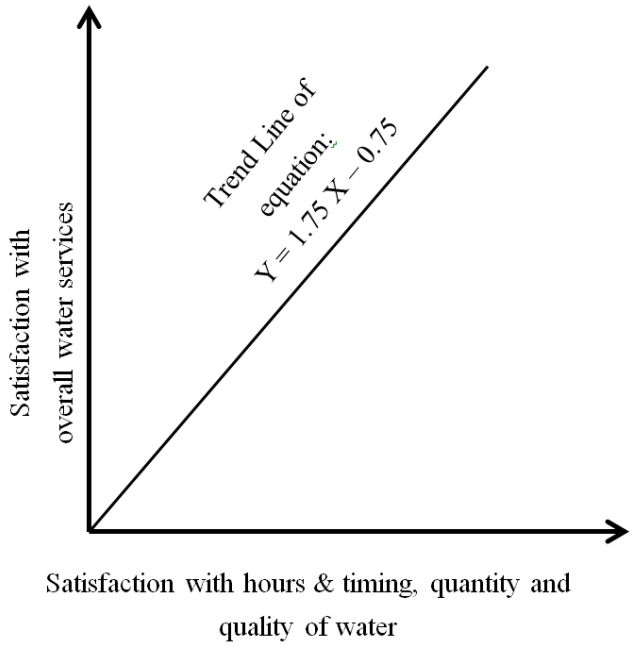

Figure 2. *Trend Line.*

According to the study, 43% of respondents who paid an average monthly water cost of less than Rs. 200 expressed satisfaction with the water tariff, while 42% of respondents who paid an average monthly water tariff of Rs. 201 to Rs. 500 expressed satisfaction. Similarly, the majority of respondents who spent an average of more than Rs. 1000 per month for water tariff were not satisfied with water tariff, while almost 53% of respondents who paid between Rs. 501 and Rs. 1000 per month for water tariff were neutral. The chi-square test between satisfaction with water tariff and

average water tariff per month was done and the result shows chi-square statistics of 22.185 and the p-value is less than 0.05 indicating that there is a significant association between satisfaction with water tariff and average water tariff per month of respondents.

3.3. Regression Analysis

This study also uses secondary data analysis based on the multiple regression model mentioned in the literature review to test the results' statistical significance and robustness. The association between different satisfaction metrics and overall satisfaction with water services was investigated using multiple regression analysis [6]. This section aims to evaluate the model's validity using statistical tests of significance, including the t-test, F-test, coefficient of determination (R-Square), and autocorrelation test. Table 4 shows regression results of overall satisfaction with water services using panel data of 396 observations. The dependent variable is overall satisfaction with water services as Oasws and the independent variables are satisfaction with hours and timing of water supply, satisfaction with water quantity and satisfaction with the quality of water as Swhtws, Swwq and Swqw respectively. As can be seen in the result, satisfaction with the hours and timing of water supply and satisfaction with the quality of water had significant positive regression weights, indicating overall satisfaction with water service was expected higher satisfaction with hours and timing of water supply and satisfaction with the quality of water [1]. As a result satisfaction with water quantity had a positive regression weight but it did not significantly contribute to the overall satisfaction with water services.

$$Oasws = \alpha + \beta 1Swhtws + \beta 2Swwq + \beta 3Swqw + \varepsilon$$

Table 4. *Regression analysis of overall satisfaction with water services & its determinants.*

Model	β	t	Significance
(Constant)	1.871	5.324	0.000
Swhtws	0.194	2.124	0.034
Swwq	0.035	0.413	0.680
Swqw	0.241	2.549	0.011
R-Square		0.54	
F-ratio		7.431	
Significance (p-value)		0.000	
Durbin Watson		1.753	

The result shows that the model is highly significant as indicated by a p-value of 0.000 and a F-ratio of 7.431. In addition, this model reveals that 54 percent of the variation in overall satisfaction is explained by these factors. The coefficient for Swhtws is computed at 0.194 which means that if the water service increases its satisfaction with hours and timings of water supply then overall satisfaction with water service increases by 19.4 percent. Likewise, satisfaction with water quantity also has a propensity to increase overall satisfaction by 3.5 percent for every 100 percent increase in overall satisfaction. Satisfaction with the quality of water has recorded a coefficient of 0.241 which tells that if we increase the overall satisfaction by 100 percent then satisfaction with the quality of water increases by 24.1 percent and the regression coefficient is also significant at a 5 percent level of significance. The tolerable value of the Durbin-Watson statistic is between 1.5 to 2.4. In the estimated equation the value of Durbin Watson is 1.753 which indicates that there is no serial autocorrelation between the residual terms. The estimated regression model is written as:

$$Oasws = 1.871 + 0.194\ Swhtws + 0.035\ Swwq + 0.241\ Swqw$$

3.4. Correlation Analysis

The variables used in this study were overall satisfaction with water service, satisfaction with water amount and quality, and satisfaction with the hours and schedule of water provision. It is therefore reasonable to anticipate that these pairings of variables will have some sort of statistically significant association [15]. Thus, the purpose of this part is to elucidate the strength and direction of the relationships between various pairings of these variables. For this reason, a correlation study has been carried out. Therefore, the direction and strength of the association between overall satisfaction with water supply and its determinates have been examined using correlation analysis. Table 5 reveals the Pearson correlation between different pairs of satisfaction variables.

Table 5. *The correlation coefficient of overall satisfaction with water services & its determinants.*

Variables	Oasws	Swhtws	Swwq	Swqw
Oasws	1.000			
Swhtws	0.188**	1.000		
Swwq	0.135**	0.475**	1.000	
Swqw	0.197**	0.388**	0.381**	1.000

‘**’ indicates that correlation is significant at a 5 percent level

The association between various pairs of explanatory variables and the statistically significant relationship between overall happiness and its determinants are displayed in the above

table. The relationship between overall satisfaction and contentment with the timing and hours of water supply has the highest positive and significant correlation coefficient (0.475) among the factors of overall satisfaction. Similarly, there is a positive correlation, significant at the 5 percent significance level, between overall happiness with water services and contentment with the quantity and quality of the water supply. In terms of significance, the degree of connection between contentment and water quality is the strongest among the observed correlations, indicating that this variable provides a more comprehensive explanation for overall satisfaction with water service. The findings indicate a favorable association between overall satisfaction with water service and contentment with the quantity, quality, hours and schedule of the water supply. The trend line and its equation are depicted in the above image. It illustrates that overall satisfaction with water services rises with increases in hours and timing, amount, and quality of water delivery. The trend line equation shows that overall satisfaction with water services increases as 1, 2.5, 4.5, and so forth, correspondingly, when a degree of satisfaction with hours and timing, amount, and quality of water improves such as 1, 2, 3.

4. Conclusion

Consistent with the findings of Bhandari and Grant (2007), the result indicates that there is no significant correlation between respondents' background variables, including occupation, gender, age, and education, and their overall satisfaction with water services [16]. Although users' satisfaction is above neutral, it is not at a satisfactory level. While there was somewhat less satisfaction with complaints about water supply, the features/aspects of the service that contributed to users' satisfaction include hours and timing, pressure, amount, and quality of water. The satisfaction with hours & timings, quantity, and quality increases the overall satisfaction with water service.

Humans have always aspired to advance and produce greater outcomes and advancements. Companies and organizations today are under pressure to perform better and face new difficulties. Additionally, since consumer expectations are evolving, many businesses and organizations now prioritize customer happiness and attention. An organization can ascertain whether it has improved and whether those improvements have had the expected impact by gauging the level of satisfaction. Furthermore, conducting surveys shows your clients that you are attentive to their wants and opinions. Evaluating the users' satisfaction with the Lekhnath small-town water supply and sanitation project was the goal of both the thesis and this study. An increasing number of businesses and institutions are utilizing customer satisfaction levels as a gauge for how well their goods and services are performing. About 36% of respondents were satisfied with water services, whereas 41% of respondents were neutral—that is, neither satisfied nor dissatisfied with the water services they received. The total satisfaction level with water services was 3.29 on the satisfaction scale. Based on the examination of primary data, there is no statistically significant correlation found between respondents' background characteristics (e.g., occupation, gender, age, education), the number of households they belong to, or their primary source of income, and their overall satisfaction with water services. However, there is a highly significant correlation with the number of years spent in a home and a substantial correlation between overall satisfaction with water services and married status. Similarly, there is strong evidence linking roof style and water source used before the project with satisfaction with water quantity. The way that water is collected and the degree of satisfaction with the water pressure is also significantly correlated. In a similar vein, the results demonstrate a very substantial correlation between respondents' manner & treatment of the water and their level of satisfaction with its quality. The availability of complaint channels is strongly correlated with management's responsiveness and communication scores.

The findings of the multiple regression analysis show a positive relationship between overall happiness with water services, satisfaction with water quality, and satisfaction with water supply hours and timings. It suggests that overall happiness with water services increases if satisfaction with hours and scheduling, quality, and quantity is higher.

Author Contributions

Narayan Timilsena is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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