OPEN ACCESS
IJNHS

Sanitation Compliance and Its Determinants in a Barangay Community: Insights from Northern Mindanao

Paolo Araune, Rodesa Shaira Cornito, Ivan John Catiil, Alexa Dumanon, Kriztle De Los Reyes, Andrea Colleen Glova, Lyka Mikaela Guitarte, Trisha Ann Kristy Ihalas, Patrice Eisrey Macalam, Jean Crystal Maderal, Ailene Grace Nagac, Kate Margarette Namoc, Kana Nilles

Xavier University-Ateneo de Cagayan

Article information

Article history:
Received: March 05th, 2024
Revised: June 09th, 2024
Accepted: July 21th, 2024

Corresponding author:
Name: Paolo B. Araune
Address: 73 Corrales Ave, Cagayan de Oro, 9000 Misamis Oriental, Philippines
E-mail: paraune@xu.edu.ph

International Journal of Nursing and Health Services (IJNHS), Volume 7, Issue 4, August 20th, 2024
DOI: 10.35654/ijnhs.v7i4.790
E-ISSN: 2654-6310

Abstract

Background: Proper sanitation practices are crucial for public health, especially in regions with limited access to clean water. **Objective**: This study aimed to assess sanitation compliance among residents in a barangay in Northern Mindanao. It investigated the influence of age, education, gender, and socio-economic status on sanitation compliance. **Methods:** This descriptive study assessed sanitation compliance among barangay residents in Northern Mindanao. Simple random sampling was used; 231 respondents aged 21 to 60 **Results:** Significant differences were observed in compliance with sanitation practices based on age, particularly regarding water facilities and use. However, no significant difference was found for sanitation facilities and use. Educational attainment did not influence compliance with either water or sanitation practices. Gender did not significantly impact compliance with sanitation practices for water and sanitation facilities and use. Socio-economic status significantly differed in compliance with water facilities and use, but not for sanitation facilities and use. **Conclusion:** While age impacted compliance with water facilities, educational attainment did not show a significant effect. Gender also did not influence compliance significantly. However, socio-economic status notably affected compliance with water facilities. These insights highlight the importance of targeted interventions to improve sanitation practices across different demographic groups, ultimately enhancing community health and well-being.
Recommendation: Clinical practitioners should focus on targeted interventions tailored to specific demographic groups, particularly addressing age-related factors affecting compliance with water facilities, and socio-economic status influencing compliance with water facilities and use, to effectively improve sanitation practices and enhance community health and well-being in regions with limited access to clean water like Northern Mindanao.

Keywords: Sanitation, compliance, public health, water

INTRODUCTION

People aim to preserve good health and prevent illnesses and other factors that may increase susceptibility to diseases. Despite efforts to provide additional public clinics, water supplies, toilets, and other facilities to ensure accessibility and cleanliness, compliance and proper utilization of these amenities remain challenging. Inadequate sanitation has long been linked to the spread of diseases such as cholera, dysentery, typhoid, intestinal worm infections, and polio (1), exacerbating malnutrition and contributing to the rise of antibiotic resistance, which presents growing challenges.

Sanitation involves the proper collection, transportation, treatment, and disposal of human waste. Enhanced sanitation not only promotes health but also improves environmental quality, thereby enhancing community well-being. Sanitation has been an ongoing concern in the Philippines, with the primary challenge being the implementation of hygienic practices despite basic cleanliness instructions (1). In response, the United Nations International Children's Emergency Fund (UNICEF) funded the Philippine Approach to Total Sanitation (PhATS) initiative one year after Typhoon Haiyan, aiming to achieve universal access to safe and appropriate sanitation facilities in the country by 2028 (1). The initiative focused on evaluating water, hygiene, and sanitation knowledge, attitudes, and behaviors. Despite indicating a high overall level of exposure to basic sanitation, the study unveiled a notable gap between the perceived importance and actual practice of handwashing.

The research study was anchored in three theoretical frameworks: The Behavioral System Model by Dorothy E. Johnson, the Self-Care Deficit Theory proposed by Dorothea Orem, and Composure Behavior by Carmelita Divinagracia. The integration of these theories into this study was crucial for a comprehensive analysis of sanitation practices and compliance. The Behavioral System Model was first proposed in 1968 (2). According to Johnson's model, the patient had a set of interconnected behavior subsystems. It was necessary to consider how the person perceived his or her behavior and how much it could be changed. A study conducted by Cheng and Luo (3) discussed that Johnson's Behavioral Systems Model (JBSM) focused on the theory that every person has a behavior system of specific kinds of repetitive and intentional behaviors. This behavior system was divided into seven subsystems: subordination, dependence, intake, gender, progress, and achievement (3). Integrating JBSM into this study allowed the researchers to understand the behavioral patterns that influence sanitation compliance among the residents, highlighting the need for targeted interventions that address these specific subsystems.

These seven subsystems comprised the conditions in which the barangay residents in Northern Mindanao complied with sanitation practices since sanitation is a continuous and repetitive action. Also, practicing and complying with sanitation generally required progress and entailed a sense of achievement for an individual. Furthermore, it was emphasized in their study that JBSM not only scientifically explained behavior changes and nursing phenomena of a specific subsystem but also made a clear assessment of how behavior functioned as a whole and paid attention to the physiological, psychological, social, and environmental components of the behavior system (3).

The second model referenced was Carmelita Divinagracia's Composure Behavior, introduced in 2001 (4). Composure, an acronym for Competence, Presence, Prayer, Open-Mindedness, Stimulation, Understanding, Respect, Relaxation, and Empathy, served as a mnemonic for an intervention strategy. Divinagracia (4) asserted that implementing this model could positively impact a patient's well-being. It exemplified the qualities that a nurse should possess in order to help patients achieve their wellness goals. Moreover, it elevated the standard of nursing care provided to patients, thereby motivating or facilitating the improvement of patient outcomes.

In studying the effect of patient acuity tools on patient clinical practicum assignments on nursing student satisfaction levels, David et al. (4) used Composure behavior as their foundation. Knowledge, clinical experience, and patient care expertise were all things that nurses could learn to increase their satisfaction. A person also had to be content in their role, as competency was influenced by job satisfaction. Additionally, the behaviors of nurses in delivering quality nursing care were one of the

many factors that impacted the patient's perspective. As the Composure behaviors engulfed the patient, their wellness outcome significantly improved, whether physiologic or bio behavioral (5). In connection with the study, the researchers wanted to use this intervention on the barangay residents in Northern Mindanao, where adherence to sanitation was strongly encouraged.

The last theory discussed was the Self-Care Deficit Theory, which was introduced by Dorothea Orem in 1971 (6). This theory underscored the notion of an individual's capacity to uphold and safeguard health through self-care practices. Gholamzadeh et al. (6) referenced this theory in their study, defining self-care as actions individuals undertake to uphold, restore, or enhance their overall well-being. Their research underscored the perspective that individuals should not be viewed solely as passive recipients of nursing care, but rather as autonomous individuals capable of taking appropriate measures for their own health.

All three assumptions were inextricably linked to each other. People lived in a society that implied their close communication with one another and often determined a particular type of behavior. Surrounding objects, situations, and even internal circumstances were frequently defining factors in the process of the human traits of character and lifestyle formation. At the same time, behavioral habits formed in childhood and developed in life also directly influence how precisely this or that person acts (7). Nurses were duty to help the patients achieve wellness until they could do it independently. Accordingly, Johnson's, Orem's, and Divinagracia's concepts intersected.

The need to explain the gap between theory and practice, as well as the gap in the literature, was evident. Previous studies have shown the importance of sanitation and the barriers to its practice, but there has been limited research on the specific behavioral subsystems and their influence on sanitation compliance. This study aimed to fill these gaps by exploring how Johnson's behavioral subsystems, Orem's self-care practices, and Divinagracia's composure behavior intersect and impact sanitation practices. By addressing these gaps, this study provides new insights into the specific factors that affect compliance, offering targeted strategies to improve sanitation practices in the context of Northern Mindanao.

This study aimed to determine the factors that affected the compliance to sanitation among the residents of a barangay in Northern Mindanao. It specifically sought to answer the following question: Was there a significant difference in compliance with sanitation practices when grouped according to age, educational attainment, gender, and socio-economic status? The hypothesis was tested using a 0.05 level of significance, stating that there was no significant difference between the compliance to sanitation practices of the respondents when grouped according to age, educational attainment, gender, and socio-economic status.

METHODS

Design

This study employed descriptive research, a research design that presented a representation of a phenomenon in its natural events. Its objective was to comprehend and ascertain the compliance with sanitation practices among the residents of a barangay in Northern Mindanao concerning water facilities and use, cleaning and disinfection, household and surrounding sanitation, and sanitation facilities and use. Descriptive research was chosen for its ability to provide a detailed and accurate account of the current state of sanitation practices without manipulating the study environment. By observing and documenting these practices, the study aimed to identify existing patterns and behaviors related to sanitation compliance.

The design outlined the characteristics and behavior of the sample population, addressing the what, where, when, and how questions but not the why questions. In this study, the researchers did not control or manipulate the variables but observed and measured them (8). Additionally, Polit and Beck (9) suggested that descriptive research offers some control over the study setting and its factors. Nevertheless, exercising control over sample selection was possible and crucial to secure a large representative sample and enhance external validity.

Sample, sample size & sampling technique

The respondents for the study comprised the residents of a barangay in Northern Mindanao, with a total population of 574 active residents. Simple random sampling, a probability sampling method, was employed in this study, where the researchers randomly selected a subset of participants from the population. Subsequently, Cochran's formula was applied to determine the sample size of the respondents, resulting in a sample size of 231 residents for this study.

The inclusion criteria used for selecting sample respondents included the following: being a resident of the barangay for at least three years, aged between 21 to 60 years old, able to read and understand Bisaya or English language, willing to participate in the study, and mentally capable of giving consent. These criteria ensured that the respondents had a stable living situation within the community, allowing them to provide accurate and relevant information about local sanitation practices. By including residents aged 21 to 60, the study targeted individuals who were likely responsible for household sanitation and thus directly involved in compliance practices. Ensuring respondents could understand Bisaya or English was essential for accurate communication and comprehension of survey questions, enhancing the reliability of the data collected. Conversely, the exclusion criteria employed for the sample respondents encompassed the following: not being a resident of the barangay, being below 21 years old or above 60 years old, having certain health conditions that could interfere with the study's results or pose a risk to the participant's health, and individuals with cognitive or mental conditions that could impact their ability to understand the study's requirements or complete tasks accurately.

Data collection process

The researchers proceeded by submitting a letter of permission to the Dean of the Xavier University College of Nursing to conduct the study. Upon approval, the signed letter was then presented to the President of the Homeowners Association of the barangay for further approval to conduct the study within the community. Once all approvals were obtained, face-to-face data collection commenced. This involved providing the respondents with an Informed Consent Form (ICF) and obtaining their signatures before proceeding with the interview. The ICF briefing was crucial as it ensured the protection of participants' rights, compliance with ethical and legal requirements, and facilitated the establishment of trust between researchers and participants.

The instrument of data collection

The research utilized surveys administered through questionnaires as its primary data collection method. The researchers devised questions focusing on sanitation practices to gauge respondents' compliance. Consequently, two subsets of questions were developed: Water Facilities and Use, consisting of 10 questions, and Sanitation Facilities and Use, comprising another ten questions. To ensure the reliability and validity of the questionnaire, Cronbach's alpha was calculated for both subsets of questions. As highlighted by Taherdoost (10), surveys serve as an efficient tool for gathering necessary data for research and evaluation purposes. The questionnaires were distributed among respondents residing in a barangay in Northern Mindanao. Questionnaires are widely employed in social science research for swiftly collecting data to obtain pertinent information aligned with the study's objectives. By using reliable and validated questionnaires, the study ensured that the collected data accurately reflected the sanitation practices and compliance of the respondents.

Data analysis

The researchers utilized the T-test and F-test as inferential statistical tools to determine population means and variances. The T-test was employed for hypothesis testing to discern whether a process or treatment influenced the population of interest or if there were differences between two groups. Similarly, the F-test was used in hypothesis testing to assess whether the variances of two populations or samples were equal. Mean and standard deviation were calculated to ascertain the average score of the provided data. Subsequently, the 4-point Likert Scale Level of Frequency was utilized to interpret both the means for the T-test, indicating differences between two variables, and the single-factor ANOVA, detecting variations among three or more variables. Hypothesis testing was further

applied to determine whether the null hypothesis, which stated no significant difference in compliance with sanitation practices among respondents in a barangay in Northern Mindanao when grouped by age, educational attainment, gender, and socio-economic status, should be rejected. If the p-value exceeded the alpha value of 0.05, the null hypothesis remained unaltered; however, if the p-value fell below the alpha value of 0.05, the null hypothesis was rejected.

Ethical consideration

Ensuring ethical conduct in the research necessitated obtaining informed consent and ensuring voluntary participation of research participants (11). Informed consent was emphasized as crucial in research ethics, aiming for individuals to engage willingly in research investigations after being clearly informed about their participation (12). Obtaining informed consent was deemed essential to adhere to ethical standards of respect, beneficence, and justice. Ethics clearance approval was obtained from the Xavier University Research Ethics Board (XU REC Package No. NSG-2023001287).

RESULTS

Table 1 presents the respondent's level of compliance with sanitation practices classified by age. These specific age ranges were chosen to capture potential differences in sanitation compliance across different life stages and demographic groups. Regarding water facilities and use, the highest compliance was observed among respondents aged 45 to 49, closely followed by those in the 25 to 29 age bracket. In contrast, concerning sanitation facilities and use, the highest mean of 3.86 was found in the 40 to 44 age category, followed closely by respondents aged 50 to 54. An F-test or ANOVA yielded p-values of 0.026 for water facilities and 0.102 for sanitation facilities. Consequently, the hypothesis was rejected, indicating a significant difference in compliance with sanitation practices among barangay residents concerning water facilities and use only when grouped by age. However, no significant difference was observed regarding sanitation facilities and use, as indicated by a p-value of 0.102, which exceeds 0.05.

The observed variations in compliance by age can be linked to the Behavioral System Model, which suggests that age-related factors such as experience and maturity influence repetitive and intentional behaviors related to sanitation. The Self-Care Deficit Theory also supports this finding, as older individuals may have developed better self-care practices over time. Additionally, the Composure Behavior framework indicates that age-related competence and understanding could enhance adherence to sanitation practice.

Table 1. ANOVA Results of Respondent's Level of Compliance to Sanitation Practices When Grouped according to AGE

Profile	Level of Compliance with Sanitation Practices			
	Water Facilities and Use		Sanitation Facilities and Use	
AGE	Mean	p-value	Mean	p-value
21 - 24	3.58	0.026*	3.74	0.102 ns
25 - 29	3.69		3.83	
30 - 34	3.66		3.72	
35 - 39	3.58		3.78	
40 - 44	3.34		3.86	
45 - 49	3.70		3.80	
50 - 54	3.50		3.85	
55 - 60	3.55		3.79	

Legend: ns = Not Significant *=Significant **=Highly Significant

Table 2 summarizes the respondent's level of compliance with sanitation practices when grouped according to their educational attainment. Regarding water facilities and use, the highest compliance was observed among residents who were college graduates, closely followed by those who reached college level but did not graduate. Conversely, for compliance

with sanitation practices in using sanitation facilities, the highest compliance was found among those who only graduated from elementary and college undergraduates, closely followed by college graduates or higher. Utilizing ANOVA or F-test, the p-values were both greater than 0.05. Therefore, the hypothesis was accepted, indicating any significant difference in compliance with sanitation practices among barangay residents in terms of both water facilities and use and sanitation facilities and use when grouped according to educational attainment.

.

Educational attainment influences compliance with sanitation practices through enhanced knowledge and attitudes, as suggested by the Behavioral System Model. Higher educational levels correlate with better understanding and implementation of sanitation practices, aligning with the Self-Care Deficit Theory's emphasis on knowledge and skills in maintaining health. The Composure Behavior framework also implies that educated individuals might exhibit higher levels of competence and respect for sanitation norms

Table 2. ANOVA Results of Respondent's Level of Compliance to Sanitation Practices When Grouped according to educational attainment

Profile	Level of Compliance with Sanitation Practices			
	Water Facilities and Use		Sanitation Facilities and Use	
Educational Attainment	Mean	p-value	Mean	p-value
Elementary undergraduate	3.51	0.293 ns	3.76	0.755 ns
Elementary graduate	3.55		3.81	
Highschool undergraduate	3.53		3.76	
Highschool graduate	3.54		3.78	
College undergraduate	3.67		3.81	
College graduate or higher	3.68		3.79	

Legend: ns = Not Significant *=Significant **=Highly Significant

Table 3 presented the respondent's level of compliance with sanitation practices classified according to their gender. Regarding water facilities and use, females exhibited slightly higher compliance with these sanitation practices than males. Regarding sanitation facilities and use, the mean values for both females and males were statistically equal. A t-test was employed, and the resulting p-values were 0.571 and 0.891 for water and sanitation facilities and use, respectively. As both p-values exceeded 0.05, the hypothesis was not rejected. Thus, there was no significant difference in the level of compliance with sanitation practices among barangay residents when grouped according to gender.

Gender differences in compliance can be interpreted through the lens of the Behavioral System Model, where gender roles and social expectations influence behavior patterns. The Self-Care Deficit Theory suggests that females might be more engaged in self-care practices, including sanitation, due to traditional caregiving roles. The Composure Behavior framework further supports that females may demonstrate higher levels of empathy and responsibility in maintaining sanitation standard.

Table 3. T-test Results of Respondent's Level of Compliance to Sanitation Practices When Grouped according to gender

Profile	Level of Compliance with Sanitation Practices			
	Water Facilities and Use		Sanitation Facilities and Use	
Gender	Mean	p-value	Mean	p-value

Female	3.59	0.571 ns	3.79	0.891 ns
Male	3.56		3.79	

Legend: ns = Not Significant *=Significant **=Highly Significant

Table 4 summarizes the respondent's level of compliance with sanitation practices classified based on their socio-economic status or household income. Regarding water facilities and use, residents with a monthly family income of P40,001 - P50,000 exhibited the highest compliance, followed by those with incomes ranging from P20,001 to P30,000. The lowest compliance level was observed among residents with a monthly family income exceeding P50,000. Regarding sanitation facilities and use, the highest compliance was among residents with a monthly family income of at least P40,001, followed by the P30,001 - P40,000 income class. Using ANOVA or F-test, the p-value for water facilities and use was 0.001, leading to the rejection of the hypothesis, indicating a highly significant difference in compliance with sanitation practices based on water facilities and use. However, there was no significant difference in compliance concerning sanitation facilities and use, with a p-value of 0.378.

Socio-economic status influences compliance through access to resources and education, as suggested by the Behavioral System Model. Higher income levels enable better access to sanitation facilities and education about proper sanitation practices, aligning with the Self-Care Deficit Theory's emphasis on resource availability for self-care. The Composure Behavior framework also indicates that individuals with higher socio-economic status may have more opportunities to develop and maintain competence in sanitation practices.

Table 4. ANOVA Results of Respondent's Level of Compliance to Sanitation Practices When Grouped according to socio-economic status

Profile	Level of Compliance with Sanitation Practices			
	Water Facilities and Use		Sanitation Facilities and Use	
Socio-economic Status	Mean	p-value	Mean	p-value
Less than P10,000	3.53	0.006**	3.78	0.378 ns
P10,000 - P20,000	3.67		3.81	
P20,001 - P30,000	3.68		3.71	
P30,001 - P40,000	3.52		3.87	
P40,001 - P50,000	3.90		3.90	
More than P50 000	2.40		3.90	

Legend: ns = Not Significant *=Significant **=Highly Significant

DISCUSSION

According to a study by Lave et al. (13), age played a crucial role in sanitation behaviors, with older and young adults demonstrating a higher inclination to comply with sanitation practices than children. The findings of this study align with the results presented in Table 1, indicating that compliance with the correct use of sanitation facilities is efficient regardless of age. In contrast, the study by Gafoor et al. (14) does not fully align with these results, as their findings show that age plays a role in water sanitation, with the highest usage observed among the elderly and the young. The results of the researchers' study indicated a significant difference, highlighting compliance among individuals aged 25 and older. While age does show a significant difference, it is limited to the context of water facilities and use.

In relation to water facilities and usage, as highlighted by V. Raghupathi and W. Raghupathi in 2020 (15), lower educational attainment was correlated with self-reported poor health. However, this association was intricate and involved factors such as past health issues during childhood. The research suggested that individuals with higher levels of education generally enjoy better health outcomes, reflected in higher rates of self-

reported health and lower levels of morbidity, mortality, and disability. Despite these overarching findings, the specific outcomes of the study could have provided more robust evidence to indicate a significant difference in compliance with sanitation practices among residents with varying educational backgrounds concerning water facilities and usage. This suggests that other factors may have a more significant influence on adherence to sanitary standards, or, in this specific context, educational attainment may not have a substantial impact on compliance.

Regarding sanitation facilities and use, Abubakar's study (16) reported that educated households tended to use modernized sanitation facilities, while less educated households were identified as using pit latrines and practicing open defecation for waste disposal. In line with the findings of Ganguly and Satpati (17), an individual's awareness and knowledge of hygiene-related concerns were crucial elements in identifying positive hygiene behaviors. This outcome contradicts the results, suggesting no significant difference between educational attainment and compliance with sanitation practices.

The study conducted by Laari et al. (18) highlighted the importance of women in maintaining cleanliness at home and in the neighborhood, stressing the need to consider women's perspectives in land use planning decisions, especially regarding sanitation. Referring to a study in rural areas of Pakistan by Khan and Zafar (19), it was found that men were more likely to use sanitation facilities than women. In contrast, a study on urban and rural areas (20) concluded that females exhibited higher levels of compliance with sanitation practices than males. These diverse outcomes underscore the contextual differences that can exist across various regions and communities.

The collective findings from previous studies in the literature review indicated gender differences in compliance with water and sanitation practices. Women tended to be more compliant with water use regulations and more likely to utilize water and sanitation facilities, mainly when provided with separate, gender-specific facilities. However, conflicting results from other studies suggested that compliance and awareness of sanitation practices could vary based on contextual and cultural factors. In the current study, Table 3 presented the levels of compliance with sanitation practices among respondents categorized by gender. The findings indicated no significant difference in compliance levels among the barangay residents when grouped by gender. It is essential to note that these specific results pertain to the barangay study and may not necessarily generalize to broader gender dynamics and compliance patterns in other contexts. Specific cultural and societal factors could also influence the outcomes in the barangay. Further research and a comprehensive exploration of gender dynamics in sanitation practices would contribute to a more nuanced understanding of the topic.

The findings of the study conducted by Briones-Garcia et al. (21) presented contrasting results compared to the earlier study regarding water facilities and use. In contrast to Briones-Garcia et al. (21), which identified higher water access in lower-income households than in higher-income households in Mexico, the data collection results reported here indicated that families with a monthly income exceeding P50,000 exhibited the lowest compliance level. Conversely, residents in the P40,001 - P50,000 monthly family income bracket demonstrated the highest compliance.

In another study, Kong et al. (22) discovered that households with high socio-economic status exhibited better access to sanitation facilities and higher utilization levels, aligning with Rahman et al.'s (23) findings that lower-income households and communities experienced worse access but higher usage of sanitation facilities. Like Lau et al. (24), these studies suggested that households with higher socio-economic status were more likely to possess various sanitation facilities. However, the results mentioned earlier revealed no significant difference in compliance with sanitation practices among barangay residents concerning sanitation facilities and use when grouped by socio-economic status. This finding implies that the statistical analysis did not uncover sufficient evidence to support the existence of a significant difference in compliance based on socio-economic status. The findings suggest that socio-economic status may not be a crucial factor influencing compliance in this context, or other factors may exert a more significant influence.

CONCLUSION

The researchers aimed to identify factors influencing sanitation compliance among barangay residents in Northern Mindanao, categorized by age, educational attainment, gender, and socio-economic status. Key findings revealed that the 45 to 49 age group had the highest compliance with water facilities and use, indicating their greater adherence to water conservation practices. However, no significant age-based differences were found for sanitation facilities and use. Educational attainment did not significantly affect compliance, with similar behaviors observed across different education levels. Gender also did not influence compliance, as both males and females showed comparable adherence to sanitation practices. Socio-economic status had a significant impact on compliance with water facilities, with the highest compliance observed in the P40,001 - P50,000 income bracket, suggesting better access to proper water facilities in this group. No significant differences in sanitation facilities use were found based on socio-economic status. These findings highlight the need for targeted interventions, such as age-specific educational campaigns for water conservation and inclusive sanitation initiatives that cater to all genders and educational backgrounds. Additionally, improving water infrastructure access in lower-income communities is crucial to bridging sanitation compliance gaps across socio-economic strata, ultimately enhancing public health and well-being. These insights provide a roadmap for policymakers, public health officials, and community leaders to design effective strategies to foster improved sanitation practices and overall health in Northern Mindanao.

REFERENCES

(1) World Health Organization. Sanitation. World Health Organization. [Internet]. 2022 [cited 2022 Oct 14]. Available from: https://www.who.int/news-room/fact-sheets/detail/sanitation

(2) Holaday B. Dorothy Johnson's behavioral system model and its applications. In: Smith MC, Parker ME, editors. Nursing theories and nursing practice. 4th ed. Philadelphia, PA: F.A. Davis Company; 2017. p. 89-104.

(3) Cheng Y, Luo YW. The Application Progress of Johnson's Behavior System Model. Yue Cheng,etal. J Eng Res Appl. [Internet]. 2020 Mar 14 [cited 2022 Oct 20]. Available from: https://www.ijera.com/papers/vol10no3/Series-5/G1003053942.pdf

(4) Divinagracia C. COMPOSURE Behavior of the Advanced Nurse Practitioner on the Wellness Outcome of Selected Cardiac Patients at Philippine Heart Center. Dissertation. University of the Philippines College of Nursing Library, Manila, Philippines; 2001.

(5) David MLV, Bano RAV, Joven EFS, Manansala NR, Ana MGS, Cabanes RVD, Glinoga MG. The Effect of Patient Acuity Tool on Patient Clinical Practicum Assignments on Nursing Student Satisfaction Levels: A Quasi-Experimental Study. Jurnal Keperawatan Padjadjaran. 2021;9(2):138–147. doi:10.24198/jkp.v9i2.1668

(6) Gholamzadeh S, Khademian Z, Kazemi Ara F, Gholamzadeh S. The Effect of Self Care Education Based on Orem's Nursing Theory on Quality of Life and Self-Efficacy in Patients with Hypertension: A Quasi-Experimental Study. Int J Community Based Nurs Midwifery. 2020 Apr;8(2):140-149. doi:10.30476/IJCBM.2020.81690.0. PMID:32309455; PMCID: PMC7153422.

(7) Alligood E. Nursing Shared Governance: Hospital Librarians Collaborating for Quality. J Hosp Librariansh. 2018 Apr 3;18(2):160-7.

(8) McCombes S. Descriptive research: Definition, types, methods & examples. Scribbr [Internet]. 2022 [cited 2022 Nov 6]. Available from: https://www.scribbr.com/methodology/descriptive-research/

(9) Polit DF, Beck CT. Nursing research: Principles and methods. 7th ed. Lippincott Williams and Wilkins; 2017.

(10) Taherdoost H. How to design and create an effective survey/questionnaire; A Step by Step Guide. SSRN. [Internet]. 2018 [cited 2022 Nov 6]. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3224226

(11) Josephson A, Smale M. What Do you Mean by "Informed Consent"? Ethics in Economic Development Research. Appl

Econ Perspect Policy. 2020;43(4):1305–1329. doi:10.1002/aepp.13112

(12) Xu A, Baysari MT, Stocker SL, Leow LJ, Day RO, Carland JE. Researchers' views on, and experiences with, the requirement to obtain informed consent in research involving human participants: a qualitative study. BMC Med Ethics. 2020;21(1). doi:10.1186/s12910-020-00538-7

(13) Lave RA, et al. The Impact of Age on Water Use Behaviors: A Systematic Review.

(14) Gafoor A, Jayasekara S. A Study on the Use of Water Facilities among Different Age Groups in Sri Lanka. 13th ed., Vol. 17.

(15) Raghupathi V, Raghupathi W. The influence of education on health: an empirical assessment of OECD countries for the period 1995–2015. Arch Public Health. 2020;78:20. doi:10.1186/s13690-020-00402-5

(16) Abubakar IR. Access to Sanitation Facilities among Nigerian Households: Determinants and Sustainability Implications. Sustainability. 2017;9(4):547. doi:10.3390/su9040547

(17) Ganguly L, Satpati L. Sanitation and hygiene status among school students: A micro study on some selective schools of North Dumdum municipality area, West Bengal. Int Res J Public Environ Health. 2019;6(6). doi:10.15739/irjpeh.19.015

(18) Laari S, Töyli J, Solakivi T, Ojala L. Firm performance and customer-driven green supply chain management. J Clean Prod. 2019;112:1960–1970. doi:10.1016/j.jclepro.2015.06.150

(19) Khan S, Zafar M. Gender Differences in the Use of Sanitation Facilities in Rural Areas. Int J Curr Res. 2017;9(07):51754-51757.

(20) Novotný J, Mamo BG. Household-level sanitation in Ethiopia and its influencing factors: a systematic review. BMC Public Health. 2022 Jul 29;22(1):1448.

(21) Briones-García MP, López-García MA. Socioeconomic differences in access to and use of water facilities in Mexico. Ecosyst Serv. 2020;44:100919.

(22) Kong Y, Anis-Syakira J, Fun WH, Balqis-Ali NZ, Shakirah MT, Sararaks S. Socio-Economic Factors Related to Drinking Water Source and Sanitation in Malaysia. Int J Environ Res Public Health. 2020;17(21):7933. doi:10.3390/ijerph17217933

(23) Rahman Z, Mamat S. Gender and Water Compliance: An Analysis of Toilet Use in Public Spaces.

(24) Lau LLH, Hung N, Go DJ, Ferma J, Choi M, Dodd W, et al. Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: A cross-sectional study. J Glob Health. 2020;10(1). doi:10.7189/jogh.10.01100