

Health Practice Deficits and Their Determinants Among School Learners in Low-Resource Philippine Districts

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Abstract. Health is a multidimensional construct encompassing physical, mental, emotional, intellectual, spiritual, social, and environmental well-being. Among school-age populations, establishing sound health behaviors is critical, as patterns formed during childhood and adolescence tend to persist into adulthood. This study investigated the health practices of Grade 6, Grade 9, and Grade 12 learners in the Reina Mercedes District, Division of Isabela, Philippines, during the school year 2020–2021, employing a convergent parallel mixed-methods design to capture both the breadth and depth of student health behaviors. On the quantitative strand, a researcher-made questionnaire (Cronbach's alpha = .86) assessed 114 health behaviors across six dimensions: physical health, comprising personal hygiene, health and safety habits, nutrition, dental health, and fitness and wellness, along with mental and emotional health, intellectual health, spiritual health, social and reproductive health, and environmental health, using a four-point Likert-type frequency scale. A stratified random sample of 228 respondents was drawn from 9 elementary and 2 secondary schools using Slovin's formula. On the qualitative strand, structured and semi-structured interviews and focus group discussions with 74 participants generated contextual data, which were analyzed using thematic analysis. Quantitative results showed that all category means fell within the Very Often range (2.50–3.24), reflecting generally favorable self-reported health behaviors. Annual dental visitation was the sole Never-rated practice ($M = 1.59$). Thematic analysis yielded 19 emergent themes, including restricted outdoor recreation, body odor, inadequate water intake, sleep deprivation, and adolescent substance use. Integrating both strands reveals that moderate adherence to health behaviors coexists with structural barriers, poverty, low parental educational attainment, pandemic restrictions, and digital saturation, which impede optimal health practices. These findings underscore the urgent need for a comprehensive, multi-dimensional, community-partnered school-based health education program across all grade levels.

Keywords: health literacy; health practices; Philippine public schools; school-based health education program

Introduction

Health constitutes a foundational prerequisite for educational achievement, economic productivity, and national development (Kolbe, 2019; World Health Organization [WHO], 2017). The WHO defines health as a state of complete physical, mental, and social well-being, not merely the absence of disease, an understanding that necessitates multidimensional assessment and multi-sector intervention. This holistic perspective is especially urgent for school-aged populations, given that health behaviors established in childhood and adolescence tend to persist into adulthood (Centers for Disease Control and Prevention [CDC], 2020).

In the Philippines, overlapping challenges of weak health systems, poverty, and low health literacy compound health risks for young people. UNICEF Philippines (2019) reported that Filipino children increasingly suffer from poor nutrition and stunted growth. Peltzer and Pengpid (2015) identified tobacco use, physical inactivity, overweight, and poor oral hygiene as leading health-risk behaviors among in-school Filipino adolescents. Nationally, the Philippines ranks 110th of 180 countries on a child flourishing index (Ordinario, 2020), and low health literacy, particularly among the poor and marginally educated, is identified as a primary barrier to improved health outcomes (Mateo, 2014).

The COVID-19 pandemic deepened these challenges. The WHO classified the Philippines among the most vulnerable ASEAN member states due to weak health infrastructure (Lim, 2020). Lockdown-enforced social deprivation disrupted physical activity, mental health, and social development among adolescents (Orben et al., 2020; Singh et al., 2020). Meanwhile, the Department of Education's modular distance-learning

response created new inequities in access to health information, with many learners unable to access digital resources and experiencing disengagement from learning materials.

Schools are widely recognized as the most effective settings for health promotion, given their unrivaled access to large, age-diverse populations during formative developmental periods (Kolbe, 2019; Turunen et al., 2017). The CDC's Whole School, Whole Community, Whole Child (WSCC) model and the Health Promoting Schools (HPS) framework both demonstrate that comprehensive, evidence-based school health programs improve health outcomes, academic performance, and lifelong well-being (de Medeiros et al., 2018; Griebler et al., 2014). Yet in the Philippines, school health programming remains fragmented and under-evaluated (Javier et al., 2019).

The Reina Mercedes District of Isabela is a predominantly agricultural, fourth-class municipality where low household income, limited health infrastructure, and low parental education create layered health vulnerabilities for learners. No prior multi-dimensional, empirically grounded assessment of student health practices had been conducted in this district. Guided by Stoewen's (2017) six dimensions of wellness—physical, intellectual, emotional, social, spiritual, and environmental—this study was designed to fill that gap.

Research Questions

The study addressed two research questions;

1. What are their health practices across six health dimensions?
2. What health problems and concerns do they encounter?

Scope and Delimitation

This study investigated the health practices of Grade 6, Grade 9, and Grade 12 students across nine elementary and two secondary public schools in the Reina Mercedes District, Division of Isabela, Philippines, during the 2020–2021 school year. The three grade levels were chosen to represent the final years of each stage of the Philippine Basic Education curriculum, providing a cross-sectional view of health behaviors across developmental stages. Health practices were evaluated across six dimensions: physical, mental and emotional, intellectual, spiritual, social and reproductive, and environmental health, using a convergent parallel mixed-methods approach involving 228 survey participants and 74 qualitative participants. The study focuses only on public schools within a single district, and the results are not intended to apply beyond similar rural public-school settings. Data collection took place during the COVID-19 pandemic, which created unusual social and behavioral conditions that may have affected reported practices. Also, the study depended entirely on self-reported data; no clinical assessments or biomarkers were used to confirm behavioral responses. While structural barriers—such as poverty, low parental educational levels, pandemic restrictions, and digital saturation—were identified as contextual influences, systematically analyzing them is outside the main scope of the study.

Literature Review

Comprehensive school-based health programs that combine curriculum, physical environment, and community partnerships consistently outperform single-component approaches in creating lasting changes in health behaviors (de Medeiros et al., 2018; Kolbe, 2019; Turunen et al., 2017). Griebler et al. (2014) found that student involvement in designing health promotion efforts enhances both ownership and the sustainability of results. Matingwina (2018) summarized evidence linking school health initiatives to improvements in academic achievement, particularly in nutrition, physical activity, and mental health. Despite this evidence, school health programs in the Philippines remain scattered and are poorly evaluated at the district level (Javier et al., 2019). Adams et al. (2016) warned that programs that ignore structural barriers to access may worsen health inequities by benefiting already-advantaged groups while leaving vulnerable populations behind, a concern directly relevant to the underfunded context studied here. Sur et al. (2017) and Woolley et al. (2018) showed that community-engaged, locally responsive programs produced better outcomes in low-income Filipino communities than standardized national approaches, supporting the community-partnered program design proposed here.

Oral disease is the most common unmet health need among Filipino schoolchildren, with dental caries mainly affecting low-income populations where preventive dentistry is often excluded from primary care (Kassebaum et al., 2017; UNICEF Philippines, 2019). Access to professional dental care in these areas typically occurs only for emergency extractions, driven more by cost than by health beliefs (Peltzer and Pengpid, 2015). De Medeiros et al. (2018) showed that school-based dental screening programs are effective because they catch issues before the need for extraction arises. Nutritional deficiencies also reflect limited food environments rather than simple dietary neglect: Haines et al. (2019) reported that in food-swamp conditions, the low cost

and nearby availability of ultra-processed foods often reduce dietary choices, regardless of nutritional knowledge. Agdeppa et al. (2019) found that school nutrition programs in the Philippines achieve better results when they involve mothers and local food systems, along with classroom education. Faught et al. (2017) found that healthy eating habits are positively associated with academic performance, making nutrition a key target for both health and education initiatives. Hygiene practices are similarly limited by infrastructure: Ghebreyesus (2017) observed that without access to clean water, soap, and sanitation facilities, hygiene depends heavily on knowledge. This aligns with Denuwara and Gunawardena's (2017) finding that high health literacy does not always lead to healthy behaviors when structural conditions hinder implementation.

Approximately 20% of school-aged children and adolescents worldwide exhibit clinically significant mental health issues, with rates notably higher among those facing chronic economic stress (Gutmann et al., 2019). Carrion et al. (2019) found, through a systematic review, that interactive, school-based mental health interventions outperform informational approaches in achieving behavioral outcomes, while Granrud (2019) identified early detection through school health services as the most practical intervention method in populations lacking access to private mental health care. The COVID-19 pandemic greatly worsened these problems: Singh et al. (2020) reported increased anxiety, depression, and behavioral issues among Southeast Asian adolescents during lockdown, and Orben et al. (2020) presented neurobiological evidence that pandemic-induced peer-interaction deprivation disrupted adolescent brain development, with effects lasting beyond the immediate crisis. In the Philippine context, Lau et al. (2020) showed that low health literacy and limited access to information significantly hindered the adoption of preventive mental health behaviors in low-income communities during the pandemic.

Health literacy, the ability to obtain, process, and act on health information, is a stronger predictor of health behavior and outcomes than health knowledge alone (Stars, 2018; Sukys et al., 2017). Berens et al. (2016) found that health literacy varies significantly by educational attainment and socioeconomic status, with the largest gaps among low-income, low-education groups. Javier et al. (2019) found that Filipino adolescents scored notably lower on health literacy measures than similar ASEAN peers, attributing this to the inadequate integration of health education into interactive and experiential teaching methods. The link between digital access and health literacy is not simply positive: Johnson and Barrett (2017) showed that digital health content does not lead to behavioral change when educational support is missing, while Zhang et al. (2020) found that functional health literacy, applying information to behavior, was most limited in populations with little educational support. These results show that providing technology without effective teaching strategies may deepen, rather than reduce, health literacy gaps. This theoretical insight is extended empirically in the present study through combined mixed-methods evidence.

In religiously oriented populations like the Philippines, spiritual wellness goes beyond personal faith, including social benefits from community fellowship, mutual aid, and intergenerational mentorship (Galvez et al., 2020; Stoewen, 2017). White (2020) identified meaning and spiritual engagement as key to psychological well-being and motivation. Woolley et al. (2018) noted that strong family and community bonds serve as health-protective resources in rural Philippine communities, helping offset the negative effects of poverty on health outcomes. De Jesus and Martinez (2019) found that Filipino senior high school students lack sufficient reproductive health knowledge to make informed prevention choices, mainly due to insufficient curriculum integration. Carrion et al. (2019) showed that interactive, skill-based reproductive health programs in schools significantly outperform info-based approaches, supporting the addition of structured reproductive health education in the proposed program.

Environmental health in low-income community settings mainly depends on structural sanitation infrastructure rather than individual behaviors. Ghebreyesus (2017) reported that 2 billion people lack access to safe water and that over 4 billion lack adequate sanitation, leading to risks such as waterborne diseases, respiratory illnesses, and vector-borne infections. Ignacio et al. (2015) found in a Philippine community study that deficits in environmental sanitation were more predictive of health outcomes than individual knowledge levels, highlighting the importance of structural conditions over behavioral interventions in this area. Woolley et al. (2018) and Sur et al. (2017) identified local government enforcement of sanitation ordinances and investment in community infrastructure as vital complements to school-based health programs in rural Philippine communities. The consistent message across this literature is that improving environmental health requires governance-level actions as a fundamental prerequisite, not just as an add-on to other programs.

The Philippines was ranked among the most vulnerable ASEAN health systems at the start of the COVID-19 pandemic due to existing infrastructure weaknesses and high poverty levels (Lim, 2020). The DepEd's modular distance learning approach, while maintaining some educational continuity, introduced specific health literacy risks: removing teacher mediation from learning processes widened existing pedagogical gaps and made entertainment the default use of available technology, further widening pre-existing digital health literacy gaps (Javier et al., 2019). Pandemic-induced economic shocks in agricultural

communities—including crop losses, livestock losses from African Swine Fever, and typhoon damage—disrupted household incomes, pushing older adolescents into casual labor—a trend that displaced health-promoting behaviors and academic engagement not previously documented in Philippine school health literature. These overlapping pandemic-specific factors, layered over longstanding structural health barriers, form the unique context that sets this study apart from pre-pandemic school health research.

Methodology

Research Design

This study used a convergent parallel mixed-methods design (Creswell & Plano Clark, 2018), in which quantitative survey data and qualitative interview and focus group data were collected concurrently, analyzed separately, and then combined during interpretation. This design was chosen because neither method alone could fully capture the complexity of health practice patterns: survey data measured how often and how health behaviors are distributed, while interview and focus-group data offered deeper explanations, highlighting the personal, family, and structural factors that drive those patterns.

Sampling Design

The study employed a stratified random sampling design to ensure proportional representation of students across different educational levels. The target population was divided into three strata: Grade 6 elementary students, Grade 9 junior high school students, and Grade 12 senior high school students enrolled in public schools in the Reina Mercedes District during the 2020–2021 school year. Using Slovin's formula at a 95% confidence level and a 5% margin of error, respondents were proportionally allocated across strata, resulting in a total sample size of 228 students. These were drawn from nine elementary schools and two secondary schools, while four riverside elementary schools and two co-located multi-grade schools were excluded due to logistical and safety constraints during the pandemic period.

Research Participants

The research participants consisted of 228 students, including 83 Grade 6 pupils, 82 Grade 9 students, and 63 Grade 12 students. A total of 57.5% were female ($n = 131$) and 42.5% were male ($n = 97$), with ages ranging from 10 to 22 years ($M = 14.3$). The largest age group was 14–15 years (33.3%), followed by 10–13 years (30.7%), 16–18 years (27.2%), and 19–22 years (8.8%). Most respondents came from households where parents had education below the college level, with 87.3% of fathers and 80.7% of mothers not completing college. Fathers were commonly engaged in farming and skilled labor, while more than half of the mothers were homemakers. The majority of participants lived in concrete or semi-concrete houses and had access to basic water and sanitation facilities, with most households reporting availability of alcohol for hygiene and more than half of the respondents having received polio immunization.

Research Locale

The study was conducted in the Reina Mercedes District, Division of Isabela, Region II (Cagayan Valley), Philippines, a predominantly agricultural municipality characterized by high poverty incidence and limited access to health services. The district operates nine elementary schools and two secondary schools under the Department of Education, all of which served as study sites. Data collection took place during the 2020–2021 school year, when schools were operating under alternative delivery modalities due to the COVID-19 pandemic, a contextual factor considered in the interpretation of the findings.

Research Instrument

The researcher-constructed questionnaire comprised two parts. Part I captured 10 demographic variables: sex, age, grade level, parents' educational attainment and occupation, housing type, water source, toilet type, hygiene/first aid supplies available at home, and immunization history. Part II comprised 114 items assessing the frequency of health behaviors across six domains, using a four-point Likert-type scale (1 = Never, 2 = Sometimes, 3 = Very Often, 4 = Almost Always). Content validity was established through expert review by a subject-matter professor, a research specialist, and a psychometric expert. A pilot test with 40 respondents yielded Cronbach's $\alpha = .86$. A structured and semi-structured interview guide was developed with domain-specific probing questions to elicit in-depth accounts of health beliefs, barriers, household practices, and community context. The guide was designed to complement and expand upon survey items, enabling triangulation across instruments. Questions were prepared in both English and Filipino to ensure linguistic accessibility. A diary was used to record field observations.

Data Gathering Procedure

Following approval from the Schools Division Superintendent and the district supervisor, questionnaires were distributed through homeroom advisers during scheduled weekly Self-Learning Module (SLM) sessions, the prevailing modular distance-learning modality. A Google Form version was also deployed via class group chats. Questionnaires were retrieved during the subsequent SLM retrieval schedule. Interviews and focus groups were conducted through a combination of face-to-face sessions in barangays with no active COVID-19 cases (strictly adhering to minimum health standards), telephone calls, text messages, and Facebook Messenger. All minor respondents participated with written parental/guardian consent. Data confidentiality was maintained in accordance with the Philippine Data Privacy Act.

Results and Discussions

Research Question 1. What are their health practices across six health dimensions?

Table 1. Category Means of Health Practices Across Six Dimensions (N = 228)

Health Domain	Category Mean	Descriptive Label
1. Physical Health – Personal Hygiene	3.07	Very Often
2. Physical Health – Health & Safety Habits	3.03	Very Often
3. Physical Health – Nutrition	2.87	Very Often
4. Physical Health – Dental Health	2.99	Very Often
5. Physical Health – Fitness & Wellness	2.78	Very Often
6. Mental/Emotional Health	2.98	Very Often
7. Intellectual Health	2.87	Very Often
8. Spiritual Health	2.82	Very Often
9. Social/Reproductive Health	2.90	Very Often
10. Environmental Health	2.83	Very Often

The uniform distribution of all ten category means within the "Very Often" band, with none reaching "Almost Always" (≥ 3.25), is not evidence of adequate health behavior but a quantitative expression of structural constraint. Interpreted through the ecological systems framework (Bronfenbrenner, 1979, as cited in Matingwina, 2018), the microsystem and exosystem, encompassing household practices, peer norms, community infrastructure, and government policy, exert determinative influence over health behaviors irrespective of individual health literacy. This pattern challenges individualistic health promotion models premised on a linear knowledge-to-behavior relationship, a critique advanced within salutogenic and critical health education theory (Matingwina, 2018; Stars, 2018) but rarely tested through convergent mixed-methods evidence in low-resource Southeast Asian contexts. The study extends Wang et al.'s (2018) finding that school health behaviors remain suboptimal in the absence of systematic intervention by demonstrating that the operative mechanism is not knowledge asymmetry but structural deprivation, specifically irregular household income, absent school infrastructure, and pandemic-enforced confinement. This distinction carries direct implications for intervention design: programs predicated solely on information transfer are insufficient when structural barriers predominate, and a socio-ecological architecture is required. Within physical health, personal hygiene behaviors were most consistent ($M = 3.07$), with handwashing after toilet use ($M = 3.50$) and daily bathing ($M = 3.48$) nearing maximum adherence, reflecting well-established household hygiene norms. The key finding, however, lies in preventive care: annual dental visits were rated at $M = 1.59$, the only item rated "Never" across all 114 questionnaire items, while visiting a physician when ill remained infrequent ($M = 2.53$). These gaps are not due to attitudes but are structural. Respondents reported visiting dentists mainly for emergency tooth extractions because out-of-pocket preventive dental costs are too high for households relying on irregular agricultural income. This aligns with the care-seeking cascade described by Kassebaum et al. (2017), where delayed preventive care leads to disease progression that ultimately makes emergency extraction the only affordable option, a pattern especially common in low-income populations where preventive dentistry is not part of primary care. Although the Philippine Universal Health Care Act (RA 11223) nominally expands insurance coverage, barriers to community-level access remain structural, consistent with Lim's (2020) critique that systemic weaknesses persist despite policy reforms. The study thus provides empirical support for a two-tier intervention approach where school-based dental clinics serve as a structural necessity rather than just an addition to behavioral oral health education. Nutritional practices registered an average of 2.87, with avoidance of processed foods (average = 1.88) and sweets (average = 2.05) rated only as "Sometimes," indicating limited dietary choices rather than unhealthy preferences. These ratings reflect an unequal food

environment where cheap, locally available ultra-processed foods replace nutritious options, consistent with the food swamps documented by Haines et al. (2019) in low-income communities worldwide. This extends Faught et al.'s (2017) findings linking dietary habits to academic achievement by showing that household economic capacity suppresses the diet-achievement relationship: nutritional knowledge cannot translate into dietary behavior when income constraints determine food choices. Nutritional curricula that frame healthy eating as a matter of individual discipline, without addressing material food environment constraints, risk reinforcing rather than reducing health inequity (Stars, 2018). The study supports Agdeppa et al.'s (2019) recommendation to consider household food environments as immediate determinants and goes further to argue that local government food infrastructure, including regulated school canteens and school garden programs, must act as structural complements. Fitness and wellness recorded the lowest overall mean for physical health ($M = 2.78$), with vitamin supplementation ($M = 2.37$) and immunization status ($M = 2.12$) rated as "Sometimes," reflecting cost barriers and the absence of school-based immunization programs. Mental and emotional health had a mean of 2.98, with prosocial activities like volunteering rated as "Sometimes" ($M = 2.36$), indicating a narrower focus on self- and peer-related well-being. Intellectual health ($M = 2.87$) showed stronger interpersonal behavior ($M = 3.32$) compared to resource-based academic activities like library and internet use for learning ($M = 2.38$), a gap supported by the lack of functional library facilities in most district elementary schools. Spiritual health ($M = 2.82$) displayed notable intra-domain variation: personal religious faith was the highest-rated item across the entire instrument ($M = 3.61$), while communal spiritual engagement, such as using talents in church services, scored a mean of 2.19. Social and reproductive health ($M = 2.90$) indicated strong family bonding ($M = 3.32$), but low STI prevention knowledge ($M = 2.47$), highlighting a gap between social connectedness and health literacy in reproductive areas. Environmental health ($M = 2.83$) showed stronger avoidance behaviors, like avoiding secondhand smoke ($M = 3.38$), than proactive sanitation practices, such as proper livestock confinement ($M = 2.47$), shaped by local living conditions over which respondents had limited individual control.

Research Question 2. What health problems and concerns do they encounter?

Table 2. Frequency of Health Problems and Concerns Reported by Learners Across School Levels

Health Problem/Concern	Elementary (n=26)	JHS (n=33)	SHS (n=15)	Total (N=74)
Lack of recreation due to health-protocol restrictions	18	23	10	51
Body odor, sweaty underarms, smelly feet	8	21	10	39
Insufficient water intake	17	15	6	38
Pimple growth and skin allergies	7	21	7	35
Oral health problems (tooth decay, bad breath)	11	18	6	35
Little/no engagement in church activities	14	17	3	34
Excessive social-media use	7	18	8	33
Inadequate sleep	9	17	7	33
Excessive online gaming	11	16	5	32
Loss of interest in studies	11	15	6	32
Congested residential environment	11	15	5	31
Environmental sanitation (piggeries, stagnant water)	9	11	5	25
Head lice and dandruff	12	10	3	25
Delaying urination	5	13	5	23
Frequent illness	9	7	4	20
Cigarette smoking	0	10	7	17
Working-student status	0	8	5	13
Alcohol consumption	0	8	3	11
Ear infection	3	2	2	7

Table 2 indicates that learners' reported health concerns cluster around behavioral restrictions, hygiene-related issues, and emerging lifestyle risks, with notable variation across school levels. The most prevalent concern across all groups was restricted recreation due to health protocols ($n = 51$), highlighting the sustained impact of pandemic-related limitations on physical and social activity. This is followed by personal hygiene concerns—particularly body odor ($n = 39$), skin conditions ($n = 35$), and oral health problems ($n = 35$)—which appear more pronounced in adolescent groups (JHS and SHS), suggesting increased self-awareness and physiological changes during adolescence.

Lifestyle-related risks are also prominent, including insufficient water intake ($n = 38$), inadequate sleep ($n = 33$), excessive social media use ($n = 33$), and online gaming ($n = 32$). These patterns are more common in JHS and SHS, indicating a shift toward screen-based and sedentary behaviors with age. Academic and motivational concerns, such as a loss of interest in studies ($n = 32$), often co-occur with these lifestyle patterns, suggesting a potential link between digital engagement and decreased academic focus.

Environmental and structural constraints remain significant, as seen in overcrowded living conditions ($n = 31$) and sanitation-related issues ($n = 25$), which span all levels and highlight ongoing contextual challenges. Notably, risk behaviors, including smoking ($n = 17$) and alcohol use ($n = 11$), primarily occur among JHS and SHS students, while working-student status ($n = 13$) is only observed in older groups, reflecting increased exposure to socioeconomic pressures with age.

The frequency distribution in Table 3 confirms and extends the thematic patterns found in Table 2, while adding three important dimensions: developmental grade-level patterns, pandemic-specific focus, and the appearance of risk behaviors only in older groups.

Restricted recreation was the most common concern across all levels ($n = 51$), with the highest number in JHS ($n = 23$), reflecting the combination of pandemic-driven confinement and the increased peer-social needs typical of early adolescence. This pattern aligns with Orben et al.'s (2020) finding that social deprivation during the pandemic has the most disruptive developmental effects during adolescence, when peer interaction is neurologically and socially important. However, the prevalence across different levels shows that confinement disrupted health-promoting physical activity and social engagement throughout all developmental stages, not just in adolescents.

Personal hygiene concerns, such as body odor ($n = 39$), skin conditions ($n = 35$), and oral health issues ($n = 35$), are most prominent in JHS. This reflects the overlap of pubertal changes and limited access to professional dermatological and dental care. The higher prevalence in JHS rather than SHS indicates that older adolescents develop self-management strategies over time, while younger secondary students are on the brink of increased hygiene awareness but lack sufficient professional support. This pattern highlights the importance of school-based hygiene and dental programs during the transition from elementary to junior secondary school, when needs are greatest and self-care skills are still developing.

Digital and lifestyle-related concerns, including insufficient water intake ($n = 38$), excessive social media use ($n = 33$), inadequate sleep ($n = 33$), and excessive online gaming ($n = 32$), cluster in JHS, with social media use spreading more evenly into SHS. This grade-level distribution shows an increase in gadget-related health risks throughout secondary years, with gaming dominating early adolescence and social media engagement growing through senior secondary. The co-occurrence of these digital behaviors with loss of interest in studies ($n = 32$) at similar frequency levels supports the cumulative vulnerability hypothesis discussed in Table 2: digital saturation, academic disengagement, and wellness behavior displacement form a mutually reinforcing cluster rather than separate issues. Gutmann et al. (2019) identified chronic stressor buildup as increasing mental health risks in about one in five adolescents; the frequency of co-occurrence documented here provides empirical evidence that digital saturation acts as one such chronic stressor, exacerbating the effects of pandemic restrictions and economic pressures.

Environmental and structural concerns, including crowded residential areas ($n = 31$) and sanitation hazards ($n = 25$), are fairly evenly spread across levels, confirming that these are ongoing contextual issues rather than concerns specific to certain developmental stages. Their consistency across levels shows that structural environmental health issues impact all students regardless of grade. This highlights the inadequacy of age-specific behavior programs for tackling hazards that need collective infrastructure solutions.

Risk behaviors, specifically cigarette smoking ($n = 17$) and alcohol consumption ($n = 11$), appeared exclusively among JHS and SHS respondents, while working-student status ($n = 13$) was found only at the secondary levels. This developmental boundary is important: it marks a socioeconomic vulnerability threshold that emerges in early adolescence and deepens through secondary schooling, as shown thematically. The complete absence of these concerns among elementary respondents confirms that the involved risk pathways are more socioeconomically and peer-influenced rather than purely developmental, activating when older adolescents join peer networks where substances are accessible, and household income contribution is expected or required. Peltzer and Pengpid (2015) identified these behaviors as major health risks for in-school Filipino adolescents; the current frequency data indicate that their onset is associated with school level and household economic exposure rather than age alone, an important distinction for designing and timing substance prevention efforts.

Table 3. Summary of Emergent Themes from Thematic Analysis by Health Domain

Health Domain	Emergent Themes
Physical Health	Skin conditions: oral health problems; body odor; head lice/dandruff; ear infection
Health & Safety Habits	Alcohol consumption; cigarette smoking
Nutrition	Frequent illness attributed to poor diet and low immunity
Fitness & Wellness	Inadequate sleep due to gadget use; insufficient water intake; habitual urination deferral
Mental/Emotional Health	Working-student roles displacing health behaviors; restricted recreation due to COVID-19 protocols
Intellectual Health	Loss of academic engagement and module non-completion
Spiritual Health	Reduced or absent church participation
Social/Reproductive Health	Excessive online gaming; excessive social-media use
Environmental Health	Environmental sanitation issues (piggeries/stagnant water); congested residential settings

Three analytically distinct cross-cutting patterns organize the domain-level themes: the primacy of structural poverty over individual behavioral choice, the compounding effect of COVID-19 restrictions on pre-existing socioeconomic vulnerability, and the displacement of health-promoting behaviors by unmediated digital engagement.

Physical health issues were linked to a common factor: limited access to professional healthcare rather than a lack of hygiene awareness. Skin conditions, oral problems, body odor, head lice, and ear infections were seen as ongoing chronic issues rather than sudden problems, normalized by the lack of affordable professional treatment. Dental issues highlighted this most clearly: "I often experience toothaches. I also see cavities" (Respondent 15, Grade 6) represented a group for whom dental disease had become a persistent, untreated condition because treatment was financially out of reach. Body odor and skin problems were often managed with makeshift solutions, reflecting poverty's impact on hygiene resources rather than neglect of personal cleanliness. This distinction influences how school health programs address personal health responsibility.

Alcohol and tobacco use were limited to JHS and SHS respondents and were deeply rooted in peer group dynamics rather than individual predispositions. Both behaviors were initiated and financed by peers and became routine through after-school social rituals. The qualitative data revealed an adult permissiveness dynamic absent from the survey: in households where male adolescents earned income through casual labor, parents tacitly allowed substance use as a form of implicit compensation for financial contributions. The statement "Every time we go to afternoon class, someone gives me a cigarette. I cannot refuse" (Respondent 43, JHS) shows that individual refusal skills, the usual prevention approach, are insufficient without adult norm mediation and attention to household economic stressors. This introduces a socioeconomic household permissiveness pathway to peer influence research on adolescent substance initiation (Peltzer and Pengpid, 2015), which has not been previously documented in Philippine school health studies.

Frequent illness was attributed to low immunity resulting from chronic undernutrition, not as a lifestyle failure but as a constrained circumstance. "I have a weak immune system; I always get fever" (Respondent 69, Grade 6) encapsulated a perception of nutritional inadequacy as an externally imposed condition. The food environment was marked by cheap processed snacks replacing nutritious options, cost-driven substitution of regular salt with iodized salt, and reliance on artificial flavorings. These data suggest that nutritional deficits are supply-side and economic in origin, complicating any intervention that views dietary improvement mainly as a matter of individual attitude or knowledge.

Inadequate sleep, lack of proper hydration, and delaying urination habitually all pointed to a single clear theme: the systematic displacement of basic wellness behaviors by unrestricted gadget use. Sleep deprivation was the most consistently mentioned issue, with late-night gaming and streaming on social media identified as the main causes. "I often play Mobile Legends, so I am always sleep-deprived" (Respondent 36, Grade 9) and "I sleep at midnight because I stream Facebook" (Respondent 35, SHS) exemplified this trend across different grade levels. Lack of hydration was associated with distraction caused by gadgets rather than an insensitivity to thirst, while delaying urination was a conscious decision to avoid disrupting screen time. The overarching implication is that gadget regulation is more directly connected to multiple health outcomes simultaneously than any targeted education on a single issue, making it an essential focus for structural intervention.

Two themes relating to mental and emotional health reflected the pandemic-specific structural impacts on households. Restricted recreation was the most commonly mentioned concern in the qualitative data ($n = 51$), with confinement leading to boredom, anxiety, and extended sedentary behavior—similar to Orben et al.'s (2020) findings that social deprivation during the pandemic disrupts adolescent neurochemistry

and development by reducing peer interaction. More analytically significant was the theme of working students: parental job losses, livestock losses due to African Swine Fever, and typhoon damage collectively pushed older adolescents into casual labor. "I work. I go with my uncle on his construction job" (Respondent 66, SHS) illustrated a pathway between pandemic economic shocks and worsening health behaviors—an aspect largely missing from high-income country pandemic research. Along with Gutmann et al.'s (2019) evidence that ongoing economic stressors increase mental health problems in about 20% of adolescents, these data support a cumulative vulnerability hypothesis, where simultaneous exposure to social deprivation, household economic stress, and disengagement from modular learning creates nonlinear, compounding deterioration in health behaviors—effects not captured by each factor alone.

Intellectual disengagement was caused by the inaccessibility of modular Self-Learning Materials without teacher guidance, worsened by digital inequality. "I have no internet to look up module content. It is difficult. So sometimes I do not submit" (Respondent 61, JHS) illustrates the overlap of pedagogical lack of support and infrastructural shortcomings. This theme is linked to the digital displacement pattern mentioned earlier: the same devices that rob people of sleep and hydration do not serve as tools to improve health literacy, showing that digital access without proper teaching actually deepens health literacy gaps rather than bridging them. This extends Johnson and Barrett's (2017) engagement-application framework into a health literacy context.

Strong personal religious faith coexisted with significantly reduced communal spiritual engagement, largely due to pandemic gathering restrictions, transportation challenges, and, in some cases, active parental prohibitions. "My father scolds us when we go to church" (Respondent 17, Elementary) indicates a household-level constraint that operates independently of pandemic conditions. This distinction is important: while personal faith remained strong as a coping mechanism, communal spiritual practices—offering social benefits like fellowship, mutual aid, and intergenerational mentorship—were substantially diminished. According to Stoewen's (2017) dimensional wellness framework and in salutogenic terms, community spiritual engagement fosters the sense of coherence necessary to mobilize health resources during adversity (Matingwina, 2018). Its decline is a public health concern, adding to the growing body of research on religion as a social determinant of health (Galvez et al., 2020) in a pandemic-affected context that has not been previously studied in Philippine school communities.

Excessive online gaming among elementary and JHS male respondents and excessive social media use among older respondents displaced physical activity, sleep, family interaction, and, importantly, access to reliable reproductive health information. Respondents admitted to relying on unfiltered social media platforms for sexual health information, a source with well-known limitations as a health education tool. The low STI prevention knowledge score ($M = 2.47$) can therefore be attributed not only to the lack of formal instruction but also to the active replacement of verified information with unverified digital content. This finding has specific implications for curriculum design, emphasizing the need to address social media misinformation directly rather than viewing digital access as neutral or beneficial to health literacy.

Environmental issues stem from structural hazards beyond individual control: backyard piggeries spreading vector-borne diseases, dumping chemicals into waterways, inadequate garbage infrastructure, and severe overcrowding. "We are very crowded in our compound" (Respondent 74, Grade 9), which downplays the true conditions, including shared toilets, no drainage, and overlapping sleeping areas for extended families. These hazards cannot be resolved through individual behavior changes; they require enforcement of local laws and investment in community infrastructure. This approach aligns with the WHO's (2017) social determinants of health framework, which distinguishes the conditions in which people live from their personal behaviors.

Ethical Considerations

This study adhered to established ethical standards for research involving human participants. Approval was obtained from the Schools Division Superintendent of the Division of Isabela and the district supervisor of Reina Mercedes District before collecting data. Participation was voluntary, with no penalty for not participating or withdrawing. Written informed consent was obtained from the parents or guardians of minor participants, and assent was also obtained from the minors themselves. Adult participants provided their own written informed consent. All participants were informed about the study's purpose, scope, and how their data would be used before participating. Confidentiality was ensured by using numerical identifiers rather than names throughout data collection, analysis, and reporting. Data were handled in accordance with Republic Act No. 10173, the Philippine Data Privacy Act of 2012. The researcher's dual role as school head and lead investigator was recognized as a potential source of influence. To address this, questionnaires were distributed and collected by homeroom advisers rather than by the researcher, and participants were clearly informed that their responses would not affect their academic or administrative standing. The researcher kept a field diary to document observations and potential biases during data collection. Participation did not cause

any physical, psychological, or social harm. Sensitive topics were approached with non-directive questions, allowing participants to choose their level of disclosure. No deception was used at any stage of the research.

Conclusion

This mixed-methods study shows that students in elementary, junior high, and senior high schools in the Reina Mercedes District exhibit moderate, improvable adherence to health behaviors across all six wellness dimensions, with all category averages in the Very Often range. The qualitative part uncovers the structural roots of this moderation: poverty, low parental education, inadequate school facilities, COVID-19 restrictions, digital inequity, and community-level gaps in environmental sanitation. Together, the two methods demonstrate that moderate survey-level health practice scores hide serious, domain-specific vulnerabilities—most notably, the lack of preventive dental care, sleep deprivation caused by unregulated gadget use, insufficient hydration, substance use among adolescents, and academic disengagement. These combined findings support the urgent need to implement a comprehensive, multi-dimensional school-based health education program from Kindergarten through Grade 12. Such a program should address both behavioral and structural aspects; integrate health education into all subject areas; involve families, local government units, rural health agencies, and community partners; and include provisions for school infrastructure, dental and medical screenings, mental health counseling, and digital literacy. The converging evidence from both quantitative and qualitative sources provides a strong empirical foundation for this program, ensuring that its components are grounded in the documented realities of students' health lives.

Recommendations

The trajectory of this research can be strengthened with practical and policy recommendations, along with future implementation strategies. At the school level, the evidence supports establishing structural access measures such as school-based dental clinics, WASH-in-Schools infrastructure, and regulated school canteens as essential parts of behavioral health education rather than optional extras. At the district and municipal levels, the environmental health findings support LGU enforcement of ordinances on residential piggeries, waste management, and drainage infrastructure. At the national level, the study provides empirical support for aligning DepEd's health education framework with the Department of Health and LGU community health infrastructure investments; without this coordination, school-based programs will remain structurally deficient. In curriculum design, the digital saturation findings emphasize the importance of pedagogical scaffolding over content provision as the key gap in digital health literacy interventions for populations with access to gadgets but without educationally mediated use. Four research directions emerge. First, a longitudinal study on whether post-pandemic recovery restores pre-pandemic health behavior baselines or if working-student status and digital saturation have caused lasting behavioral changes would improve understanding of COVID-19's long-term epidemiological effects in low-income school populations. Second, testing structural program components, especially school-based dental clinics and school garden nutrition programs, alongside behavioral education, would help separate treatment effects and allow for cost-effectiveness analysis in similar settings. Third, the paradox of universal gadget access with educational disengagement warrants systematic study through a health information processing framework, exploring when and how adolescents transfer health information from entertainment to behavioral change. Fourth, comparing municipalities with different levels of LGU health investment would clarify whether local governance quality influences the success of school-based health programs, an issue that the current single-district study cannot address but is vital for developing evidence-based health policies in decentralized governance contexts.

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