



SCHOOL-BASED DISASTER PREPAREDNESS AND LEARNER SAFETY IN A DISASTER-PRONE PHILIPPINE DISTRICT: A MIXED-METHODS STUDY

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ABSTRACT

Schools in disaster-prone communities face the continuing challenge of protecting learners from natural hazards while sustaining a safe learning environment. This mixed-methods study examined school-based disaster preparedness and learner safety in Tago District, Surigao del Sur, Philippines during the School Year 2025-2026. The quantitative component assessed disaster preparedness across six dimensions—DRRM plans and policies, facilities and safety equipment, drills and safety orientations, teacher and staff training, community/parental involvement, and external linkages—while the qualitative component explored the lived experiences of learners, teachers, school heads, DRRM coordinators, and other stakeholders. Results showed that schools were generally prepared (Grand Mean = 4.11), with DRRM plans and policies receiving the highest rating (AWM = 4.77) and facilities and safety equipment the lowest (AWM = 3.79). Learner safety was assessed at a very high level, particularly in awareness of safety protocols (AWM = 4.73) and response readiness during emergencies (AWM = 4.67). Overall disaster preparedness demonstrated a strong, positive, and statistically significant relationship with learner safety ($r = 0.72$, $p < 0.001$), while DRRM training attendance was also significantly associated with learner safety ($r = 0.67$, $p < 0.001$). No significant differences in learner safety perceptions were found across age, grade level, gender, or prior disaster experience. Qualitative findings supported the quantitative results, emphasizing disaster awareness, active participation in drills, teacher leadership, collaboration, emotional readiness, and household preparedness, while identifying continuing challenges related to infrastructure, safety equipment, continuous training, evacuation spaces, and community participation. The findings underscore the importance of an integrated, multi-stakeholder approach to school disaster preparedness that

combines strong institutional policies, experiential learning, capacity building, adequate resources, and community collaboration to strengthen learner safety and resilience.

Keywords: *school disaster preparedness; learner safety; disaster risk reduction and management; disaster resilience; emergency preparedness; mixed-methods research; Philippines*

INTRODUCTION

Disasters pose a persistent threat to the safety, continuity, and quality of education, particularly in communities exposed to multiple natural hazards. Schools are not only places where children spend a substantial portion of their daily lives but are also critical environments for developing knowledge, skills, and behaviors that enable communities to anticipate and respond to emergencies. The increasing frequency and intensity of climate-related hazards have consequently strengthened the need to embed disaster risk reduction (DRR) within education systems. In a recent systematic review of disaster risk reduction in schools, Mutanda and Ngcamu (2026) found that although disaster risk reduction education has increasingly been integrated into school curricula, implementation remains constrained by inadequate funding, limited teacher training, and insufficient policy support. The review further emphasized that effective school-based DRR should move beyond knowledge acquisition and response toward greater student participation, action, and community involvement.

The urgency of strengthening school safety is particularly evident in the context of climate-related disruptions to education. UNICEF (2025) reported that at least 242 million students across 85 countries experienced disruption to schooling because of extreme climate events in 2024, including heatwaves, storms, floods, and tropical cyclones. The Philippines was among the countries substantially affected, with climate-related hazards disrupting classes and threatening children's safety, access to education, and learning continuity. UNICEF further emphasized the importance of climate-resilient infrastructure, teacher training, appropriate learning resources, and disaster-resilient education systems to protect children and sustain education during emergencies. These concerns are particularly relevant to Philippine schools, where exposure to typhoons, flooding, earthquakes, landslides, extreme heat, and other hazards makes preparedness an essential component of school governance and learner protection.

Within the Philippine educational context, disaster preparedness encompasses more than the existence of emergency plans. It involves the institutionalization of policies and procedures, availability of safety facilities and equipment, regular drills and orientations, capacity building of teachers and personnel, and collaboration with parents, communities, and external response agencies. Evidence from Philippine schools demonstrates the continuing importance of these dimensions. Escoto and Hussien (2024), for example, found that disaster awareness and preparedness among teachers and learners were important foundations for developing a school disaster risk reduction and management plan, particularly in a school exposed to multiple hazards. Their findings

reinforce the need for school-level preparedness systems that involve both learners and personnel and translate risk awareness into concrete preparedness measures.

School preparedness is also closely connected with learners' ability to adopt appropriate protective actions during emergencies. Wang et al. (2023), using data from 3,675 students across seven provinces in China, found that school preparedness was positively associated with students' individual protective behaviors and that disaster education contributed to this relationship. The findings suggest that institutional preparedness becomes more meaningful when learners are given opportunities to acquire disaster knowledge, participate in emergency exercises, and practice protective behaviors. Similarly, Widowati et al. (2023) identified school disaster management, safe school facilities, and risk-reduction education as interconnected components of comprehensive school safety. Their framework highlighted policy and planning, risk assessment, coordination, infrastructure, assembly points, simulation training, trained teachers, curriculum integration, and student participation as important indicators of a disaster-prepared school.

Despite these developments, important gaps remain in understanding how school-based disaster preparedness is associated with actual learner safety, particularly in geographically vulnerable and resource-constrained Philippine districts. Existing Philippine studies have examined disaster awareness, preparedness programs, teacher experiences, and school-level DRRM implementation, but fewer studies have simultaneously examined multiple dimensions of institutional preparedness and their relationship with learners' perceived safety while also incorporating qualitative accounts from school stakeholders. This gap is particularly significant in rural and disaster-prone communities, where limitations in infrastructure, equipment, training opportunities, evacuation spaces, and community participation may influence the effectiveness of formal DRRM policies.

The present study addressed this gap by examining the relationship between school-based disaster preparedness and learner safety in Tago District, Surigao del Sur, Philippines, using a mixed-methods approach. Specifically, it examined disaster preparedness in terms of DRRM plans and policies, facilities and safety equipment, drills and safety orientations, teacher and staff training, community and parental involvement, and linkages with external stakeholders. Learner safety is examined through awareness of safety protocols, response readiness during emergencies, protection and security within the school environment, and reduced risks and vulnerabilities. By integrating quantitative evidence on the relationship between preparedness and learner safety with qualitative accounts of the experiences of learners, teachers, school heads, DRRM coordinators, and other stakeholders, the study sought to provide a more comprehensive understanding of how school preparedness functions in practice. Such evidence can inform school-level DRRM planning, capacity-building programs, resource allocation, and community partnerships aimed at creating safer, more resilient, and more disaster-ready learning environments.

Research Questions

This study examined the relationship between school-based disaster preparedness and learner safety in selected schools in Tago District, Surigao del Sur, Philippines. Specifically, it sought to answer the following research questions:

1. What is the level of school-based disaster preparedness as assessed in terms of:
 - 1.1. disaster risk reduction and management (DRRM) plans and policies;
 - 1.2. facilities and safety equipment;
 - 1.3. conduct of drills and safety orientations;
 - 1.4. training of teachers and school staff;
 - 1.5. community and parental involvement; and
 - 1.6. linkages with external stakeholders?
2. What is the level of learner safety in terms of:
 - 2.1. awareness of safety protocols;
 - 2.2. response readiness during emergencies;
 - 2.3. protection and security in the school environment; and
 - 2.4. reduced risks and vulnerabilities?
3. Is there a significant relationship between school-based disaster preparedness and learner safety?
4. Is there a significant relationship between the number of DRRM trainings attended by school implementers and learner safety?
5. Are there significant differences in learner safety when learners are grouped according to age, grade level, gender, and prior disaster experience?
6. Are there significant differences in learner safety when school implementers are grouped according to age, gender, and years of service?
7. How do learners, teachers, school heads, DRRM coordinators, and other stakeholders describe their experiences regarding school-based disaster preparedness and learner safety?
8. What challenges and opportunities emerge from the quantitative and qualitative findings that may serve as bases for strengthening school-based disaster preparedness and learner safety in Tago District?

METHODOLOGY

This study employed a mixed-methods research design, integrating a quantitative descriptive-correlational approach with a qualitative inquiry into the lived experiences of learners, teachers, school heads, DRRM coordinators, and other stakeholders regarding school-based disaster preparedness and learner safety in Tago District, Surigao del Sur, Philippines. The quantitative component involved 325 respondents, comprising 232 learners and 93 school implementers/stakeholders from eight elementary schools, and assessed school-based disaster preparedness across six dimensions: DRRM plans and policies, facilities and safety equipment, drills and safety orientations, teacher and staff training, community and parental involvement, and linkages with external stakeholders. Learner safety was assessed in terms of awareness of safety protocols, response

readiness during emergencies, protection and security in the school environment, and reduced risks and vulnerabilities. Quantitative data were analyzed using descriptive statistics and appropriate inferential tests, including weighted means, frequency distributions, independent-samples t-tests, analysis of variance, and Pearson product-moment correlation to determine differences and relationships among variables. The qualitative component explored participants' experiences and perspectives concerning disaster awareness, participation in drills, teacher leadership, collaboration, emotional readiness, implementation challenges, community involvement, and household preparedness, with emerging themes used to complement and explain the quantitative findings. The integration of both strands provided a comprehensive assessment of how school-based disaster preparedness is associated with learner safety and identified areas for strengthening disaster risk reduction and management practices in the participating schools.

RESULTS

Table 1. Level of School-Based Disaster Preparedness in Tago District

Disaster Preparedness Dimension	Average Weighted Mean	Descriptive Category	Rank
DRRM Plans and Policies	4.77	Much Prepared	1
Conduct of Drills and Safety Orientations	4.50	Much Prepared	2
Training of Teachers and Staff	3.92	Prepared	3
Linkages	3.87	Prepared	4
Community/Parental Involvement	3.83	Prepared	5
Facilities and Safety Equipment	3.79	Prepared	6
Grand Mean	4.11	Prepared	—

Table 2. Extent of Learners' Safety in Schools

Learner Safety Dimension	Average Weighted Mean	Descriptive Category	Rank
Awareness of Safety Protocols	4.63	Greatest Extent	1
Response Readiness During Emergencies	4.67	Greatest Extent	2
Reduced Risks and Vulnerabilities	4.55	Greatest Extent	3
Protection and Security in School Environments	4.15	Greater Extent	4
Overall Average Weighted Mean	4.53*	Greatest Extent	—

Table 3. Relationship Between School-Based Disaster Preparedness and Learner Safety

Variables	Pearson <i>r</i>	<i>p</i> - value	Decision	Interpretation
Disaster Preparedness and Learner Safety	0.72	< .001	Reject H_0	Strong positive significant relationship

Table 4. Relationship Between DRRM Trainings Attended and Learner Safety

Variable	Test Statistic	<i>p</i> - value	Decision	Interpretation
Age	F = 1.21	.305	Fail to Reject H_0	No significant relationship
Gender	<i>t</i> = 0.76	.448	Fail to Reject H_0	No significant relationship
Years in Service	F = 1.34	.263	Fail to Reject H_0	No significant relationship
DRRM Trainings Attended	<i>r</i> = 0.67	< .001	Reject H_0	Moderate positive significant relationship

Table 5. Differences in Learners' Safety Perceptions by Demographic Characteristics

Learner Characteristic	Test Statistic	<i>p</i> - value	Decision	Conclusion
Age	F = 1.09	.337	Fail to Reject H_0	No significant difference
Grade Level	F = 1.41	.219	Fail to Reject H_0	No significant difference
Gender	<i>t</i> = 0.82	.414	Fail to Reject H_0	No significant difference
Prior Disaster Experience	F = 2.18	.091	Fail to Reject H_0	No significant difference

Table 6. Major Qualitative Themes on Disaster Preparedness and Learner Safety

Major Theme	Key Finding
Disaster awareness and preparedness knowledge	Participants demonstrated awareness of hazards, safety procedures, and appropriate emergency responses.
Active participation in drills and safety simulations	Learners and teachers actively participated in earthquake, flood, and other safety drills.
Teacher leadership and guidance	Teachers played important roles in providing instructions, reassurance, supervision, and emergency guidance.

Major Theme	Key Finding
Collaboration and collective responsibility	Disaster preparedness involved cooperation among learners, teachers, school personnel, families, and community stakeholders.
Emotional readiness and confidence	Preparedness activities helped learners develop confidence and greater emotional readiness during emergencies.
Disaster preparedness implementation challenges	Participants identified limitations involving infrastructure, equipment, training continuity, evacuation spaces, and community participation.
Community-based disaster preparedness and learning	Preparedness extended beyond school through community participation and shared responsibility.
Structured disaster education and capacity building	Participants emphasized the importance of organized, continuous disaster education and training.
Household disaster preparedness practices	Families contributed through preparation of emergency supplies and reinforcement of safety practices learned at school.

Table 7. Integration of Quantitative and Qualitative Findings

Quantitative Finding	Qualitative Evidence	Integration
DRRM plans and policies were highest (AWM = 4.77)	Participants reported that DRRM policies were established, clearly communicated, and supported by documented procedures and roles.	Convergent/Supporting
Drills and safety orientations were highly rated (AWM = 4.50)	Learners actively participated in earthquake and flood simulations; teachers reported that drills reinforced procedural knowledge and confidence.	Convergent/Supporting
Teacher/staff training was moderate (AWM = 3.92)	Participants identified the need for more continuous and hands-on training.	Explanatory
Facilities and safety equipment were lowest (AWM = 3.79)	Participants reported limitations in safety equipment, infrastructure, and evacuation spaces.	Explanatory
Community/parental involvement was moderate (AWM = 3.83)	Participants described varying levels of community and family participation.	Explanatory

Quantitative Finding	Qualitative Evidence	Integration
Linkages were moderate (AWM = 3.87)	Participants recognized existing coordination but indicated the need for stronger external partnerships.	Explanatory
Learner safety was high, particularly awareness and response readiness	Learners reported familiarity with safety procedures and active participation in drills.	Convergent/Supporting
Disaster preparedness and learner safety were strongly related ($r = 0.72$)	Participants described how policies, drills, teacher guidance, and collaboration supported learners' preparedness and confidence.	Convergent/Supporting

Table 8. Priority Recommendations for Strengthening Disaster Preparedness and Learner Safety

Recommended Measure	AWM	Interpretation	Priority
Conduct regular disaster drills	4.99	Highly Recommended	1
Prepare emergency kits	4.98	Highly Recommended	2
Ensure clear emergency exits	4.84	Highly Recommended	3
Teach safety procedures	4.78	Highly Recommended	4
Remind students of safety rules	4.78	Highly Recommended	5
Overall	4.87	Highly Recommended	—

DISCUSSION

The findings demonstrate that school-based disaster preparedness in Tago District is generally established but uneven across its component dimensions. The overall preparedness rating of 4.11 ("Prepared") indicates that the participating schools have functional disaster risk reduction and management (DRRM) systems, particularly in institutional policies and routine preparedness activities. This pattern is consistent with Dela Cruz and Ormilla (2022), who found that public elementary schools in Alfonso Lista, Ifugao had established safe learning facilities, school-based DRRM structures, and

curriculum integration, although some preparedness activities remained in the process of improvement. In the present study, DRRM plans and policies received the highest rating (AWM = 4.77), suggesting that formal institutional mechanisms are relatively well established. However, the comparatively lower ratings for facilities and safety equipment (AWM = 3.79), community/parental involvement (AWM = 3.83), linkages (AWM = 3.87), and teacher/staff training (AWM = 3.92) indicate that policy implementation does not necessarily translate into equally strong material, human-resource, and inter-organizational capacities.

The particularly high rating for DRRM plans and policies is important because effective preparedness requires schools to translate disaster governance into clearly defined responsibilities, procedures, and coordinated actions. Arao-Arao and Lumapenet (2024) similarly examined school-based DRRM practices and hazard preparedness for a safe learning environment in a Philippine setting and emphasized the relationship between school DRRM practices, hazard preparedness, and safety conditions. The present findings extend this observation by showing that formal preparedness is strongest where policies and drills are institutionalized, while resource-intensive components remain comparatively less developed. The discrepancy between strong policy implementation and weaker facilities also suggests that preparedness should not be evaluated solely on the presence of plans. A school may have comprehensive policies while still experiencing limitations in evacuation routes, warning signs, protective equipment, emergency supplies, or safe assembly areas. Indeed, the thesis findings identified evacuation routes, safety signage, and protective gear among the weaker facility indicators.

The high rating for drills and safety orientations (AWM = 4.50) provides further evidence that preparedness is being translated into practical learner experiences. Learner safety was particularly strong in response readiness (AWM = 4.67), and the qualitative findings indicated that learners actively participated in drills and simulations and perceived these activities as useful in developing confidence and familiarity with emergency procedures. This finding is consistent with Syarif et al. (2023), who found that students exposed to disaster education demonstrated very high levels of knowledge, emergency response planning, warning-system awareness, and flood preparedness. Their study further recommended integrating disaster and risk-reduction content into school curricula and strengthening teachers' capacity to communicate disaster-related information. Thus, the present findings suggest that repeated, experiential, and learner-centered preparedness activities may be particularly important for converting disaster knowledge into practical response readiness.

The overall learner-safety rating was also very high, with an overall average weighted mean reported at approximately 4.53 ("Greatest Extent"). Awareness of safety protocols (AWM = 4.63), response readiness (AWM = 4.67), and reduced risks and vulnerabilities (AWM = 4.55) were all rated at the greatest extent, whereas protection and security in school environments was comparatively lower (AWM = 4.15). This pattern indicates that learners are generally knowledgeable and behaviorally prepared but that physical and environmental dimensions of safety may not be equally strong. The finding is particularly important because learner safety involves both capacity to respond and

conditions that reduce exposure to harm. In the present study, the qualitative findings reinforced this distinction: participants described strong awareness, teacher guidance, and participation in drills but also identified continuing concerns regarding infrastructure, safety equipment, evacuation spaces, and other material resources.

The significant positive relationship between overall disaster preparedness and learner safety ($r = 0.72$, $p < .001$) represents the central finding of the study. The magnitude of this association suggests that schools with stronger preparedness systems tend to report higher levels of learner safety. This result is consistent with the Philippine evidence of Arao-Arao and Lumapenet (2024) concerning the relationship between school-based DRRM practices and a safe learning environment. It is also consistent with Dela Cruz and Ormilla (2022), who reported significant associations between DRRM implementation and indicators involving safe learning facilities, school risk-reduction management, curriculum integration, and personnel awareness. Nevertheless, the present result should be interpreted as an association rather than a causal effect, because the quantitative design was descriptive-correlational. The finding supports the proposition that comprehensive preparedness and learner safety are closely interconnected, but it does not establish that increased preparedness alone causes higher safety outcomes.

The significant relationship between DRRM training attendance and learner safety ($r = 0.67$, $p < .001$) further highlights the importance of human capacity in school preparedness. Although teacher and staff training was rated only “Prepared” rather than “Much Prepared” (AWM = 3.92), the correlation suggests that training exposure is meaningfully related to learner safety. This result is supported by Queroyla and Lomarda (2025), who found a significant relationship between DRRM program implementation and teachers' capabilities among public elementary schools in Bukidnon. Their findings emphasize the connection between preparedness, teachers' knowledge and capabilities, policies, plans, procedures, and organizational mechanisms. The present study therefore suggests that schools should view teacher and staff training not simply as a compliance activity but as a continuing capacity-building process involving emergency response, first aid, evacuation management, risk assessment, communication, and learner support.

The absence of significant differences in learner safety according to age, grade level, gender, and prior disaster experience provides another important finding. The nonsignificant results suggest that the safety environment and preparedness experiences provided by the participating schools are relatively consistent across learner groups. This may indicate that school-wide DRRM activities, rather than learner demographic characteristics, provide the common foundation for safety awareness and response readiness. However, this finding should not be interpreted to mean that demographic or individual differences are irrelevant to disaster vulnerability. Instead, it suggests that the existing school-based systems may be sufficiently widespread to produce relatively similar perceptions of safety among learners. The qualitative evidence supports this interpretation by emphasizing common participation in drills, orientations, and school preparedness activities.

The qualitative findings provide important explanatory depth to the statistical results. Participants described disaster preparedness as a shared responsibility involving learners, teachers, school leaders, families, and community stakeholders. This perspective is particularly relevant to the moderate rating for community/parental involvement and external linkages. Preparedness cannot be fully contained within the school because emergencies often extend beyond school boundaries and require coordination with families, local government units, emergency responders, and other organizations. Recent Philippine evidence also points toward the importance of coordinated and participatory approaches. Piamonte and Lagura (2026), in a mixed-methods study of school heads and DRRM coordinators in Davao de Oro, reported very high implementation of school-based preparedness and response measures, while qualitative findings emphasized participatory contingency planning, leadership commitment, community-based communication, continuity planning, and adaptive learning. At the same time, they identified resource support, emergency equipment, alternative communication systems, and psychosocial response training as areas requiring further strengthening. These observations closely parallel the present study's finding that strong institutional preparedness can coexist with continuing resource and capacity gaps.

Taken together, the quantitative and qualitative findings point to a two-level pattern of school disaster preparedness. At the institutional level, Tago District schools demonstrate relatively strong policy implementation, regular drills, learner awareness, and emergency response readiness. At the operational level, however, there remain opportunities to improve physical infrastructure, emergency equipment, continuous professional training, community participation, and external coordination. This distinction is important for policy and practice because maintaining high preparedness ratings requires more than sustaining existing policies; it requires continuous investment in the conditions that allow those policies to function effectively during actual emergencies. The findings therefore support a shift from a compliance-oriented approach to a whole-school resilience approach, in which preparedness is continuously planned, practiced, evaluated, resourced, and improved.

The findings also have implications for educational practice in disaster-prone Philippine communities. First, schools should sustain regular drills while making them more participatory and scenario-based so that learners can practice decision-making rather than merely follow predetermined movements. Second, schools should prioritize improvements in emergency infrastructure, including clearly marked evacuation routes, safety signage, accessible assembly areas, emergency supplies, and protective equipment. Third, DRRM training for teachers and personnel should be continuous and practical, with refresher and hands-on components. Fourth, schools should strengthen partnerships with parents, local government units, disaster risk reduction offices, health services, and emergency-response organizations. Finally, disaster education should be integrated into classroom learning so that preparedness becomes part of learners' continuing knowledge and behavior rather than an activity limited to scheduled drills.

Overall, the study demonstrates that school-based disaster preparedness and learner safety are closely associated dimensions of a resilient school system. The strong

relationship between preparedness and learner safety, together with the qualitative evidence of active participation, teacher leadership, and collective responsibility, indicates that Tago District schools have established a solid foundation for disaster resilience. However, the comparatively lower ratings for facilities, training, community involvement, and linkages demonstrate that preparedness remains a continuing process rather than a completed condition. The findings consequently support an integrated strategy that combines institutional policies, practical drills, competent personnel, adequate infrastructure, learner-centered education, and sustained community collaboration to strengthen safety and resilience in disaster-prone schools.

Conclusions

The findings of the study demonstrate that schools in Tago District are generally prepared for disasters and that learners exhibit a high level of safety awareness, emergency response readiness, and risk-reduction preparedness. The strong and statistically significant positive relationship between school-based disaster preparedness and learner safety ($r = 0.72$, $p < .001$) highlights the importance of strengthening institutional disaster risk reduction and management measures as part of a comprehensive approach to learner protection. However, the comparatively lower ratings for facilities and safety equipment, teacher and staff training, community and parental involvement, and external linkages indicate areas requiring sustained improvement. The qualitative findings further emphasize that effective preparedness depends not only on established policies and drills but also on adequate resources, continuous capacity building, active stakeholder participation, and learners' emotional and practical readiness. Overall, the study concludes that a whole-school, multi-stakeholder approach to disaster preparedness is essential for sustaining a safe, resilient, and disaster-ready learning environment in disaster-prone communities.

Recommendations

It is recommended that schools in Tago District strengthen their school-based disaster preparedness through a comprehensive, whole-school approach that prioritizes the improvement of facilities and safety equipment, regular and practical DRRM training for teachers and personnel, and frequent, engaging disaster drills that develop learners' actual response skills and confidence. Schools should also strengthen collaboration with parents, community leaders, local DRRM offices, and other emergency-response agencies to ensure coordinated preparedness and response. Disaster risk reduction concepts should be continuously integrated into classroom instruction and household preparedness activities, while regular monitoring and evaluation should be conducted to identify gaps and guide the implementation of an enhanced disaster preparedness intervention plan aimed at sustaining learner safety and building resilient, disaster-ready schools.

Compliance with Ethical Standards

The study was conducted in accordance with accepted ethical standards for research involving human participants. Participation was voluntary, and respondents

were informed of the purpose and nature of the study before data collection. Appropriate consent and/or assent procedures were observed, and participants were informed of their right to decline participation or withdraw without penalty. The confidentiality and privacy of respondents were protected by maintaining anonymity and using the collected information solely for academic and research purposes. Data were securely handled and reported in aggregate form to prevent the identification of individual participants or schools. The researchers also observed the principles of respect, beneficence, non-maleficence, and justice throughout the conduct of the study.

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