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A Study on the Physical Activity and Mental Health Status among Filipino Young Adult in Bacolod City, Negros Occidental, Philippines

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Abstract
This research examined the levels of physical activity and mental health of young adults residing in Bacolod City, Negros Occidental. It established the relationship between physical activity and outcomes of mental health, which included depression and anxiety. The primary aim was to acquire data to guide future wellness and mental health interventions specifically targeting the younger generation of this region. The researcher utilized a descriptive-correlational research design. The participants were determined through a method known as snowball sampling. The participants were assessed using a standardized instrument to measure their physical activity and mental health. The PHQ-9 and GAD-7 questionnaires for depression and anxiety, respectively, and the International Physical Activity Questionnaire. Using Spearman rank-order correlation coefficients, data analysis yielded a surprising result that, despite the high physical activity levels of the respondents, no correlation between physical activity and mental health outcomes could be determined. Nevertheless, the analysis yielded strong positive relationships between depression and anxiety. This study highlighted the imperative need to address mental health problems with interventions focused on increasing physical activity, especially in the socio-cultural context of Filipino young adults.

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1. Introduction

In today's generation, different physical activities have emerged and been explored, such as recreational and sports activities, high-intensity interval training (HIIT), balance exercises, flexibility, strength training, and aerobic activities. Regular exercise enhances self-concept, mood, and overall mental well-being while also improving mental health conditions like anxiety and depression [1]. From a global point of view, awareness of the connection between physical activity and mental health has gained importance [2]. The limits are beyond what it is; people's perspective sees exercise as healing and strengthening the mind. The indication that increased physical activity has been associated with improved mental health, particularly among naturally motivated individuals [3]. Also, exercise interventions, particularly low- to moderate-intensity aerobic exercise and yoga, have decreased stress and depression among university students [4].

Asians today continue to recognize the value of physical and mental health, embracing how traditional and modern practices vary with positivity and openness holistically [5]. Asians are known for physical activities such as yoga, tai chi, martial arts, and more. With the help of modernity, it embodies and reaches a larger community to learn activities like this. A program has conducted incorporating physical education and mindfulness at a university in the Philippines [6]. However, there may be multiple barriers to obtaining mental health care, such as stigma and unawareness about it [7]. The community and social connection have gained social bonds and meaningful value in life. Blending traditional fitness and modern trends have nurtured both physical and mental health [8].

Filipinos are open to modern practices moving towards the quality of physical activities that have changed them [9].For such valuing healing within the self, the connection and creativity radiate [10]. Filipinos are also known to be skilled in sports, and many well-known Filipinos have competed internationally [11]. Despite the hardships facing financial barriers and mental health stigma that may arise as a sign of weakness, Filipinos still progress and embody how it is of major help to do physical activities [12]. Younger generations were inspired by how determined they are with the fulfillment they have made [13].

Communities in the region have been providing recreational activities to the community. Engaging in activities like funrun, barangay style basketball and leagues, Zumba dance fitness, weekend rides, and bike culture [14]. There may still be some who do not recognize the impact of mental health [15]. Also, people are exposed to stress when experiencing economic constraints [16]. The purpose of this study was to assess the impact of mental health status among young adults engaged in various types of physical activities.

Other related studies' limits on young Filipino adults are often generalized across different regions, and there is a lack of data on physical activities like recreational and sports that differ from cultural activities [17]. The crisis faced by Filipinos regarding their mental well-being has been increasing [18].Still, with more help, they can access and use physical activities to lessen challenges and have more interventions available [19]. Wellness can improve through recreational activities, sports, and physical health as mental stability tools. Providing newer and improved insights into local cultural factors that are overlooked [20].

Therefore, this descriptive study assessed Filipino young adults' physical activity levels and mental health status, specifically investigating how age, gender, employment status, educational attainment, and number of hours spent engaging in physical activity correlate with the mental outcomes like depression and anxiety. The study also investigated the relationship between the variables and provided data that can be used to inform the development of future wellness programs and mental health interventions tailored for Filipino young adults especially in Bacolod City, Negros Occidental.

1.1 Framework of the Study

This study aims to describe and investigate the correlation of physical activity and mental health status of Filipino young adults residing in Bacolod City, Negros Occidental. Age, gender, employment status, educational attainment, and number of hours spent engaging in physical activity will be the factors that will relate to their mental health status in terms of depression and anxiety. Physical activity is the key independent variable that can potentially affect mental health status, which is viewed as a dependent variable. Demographic variables serve as moderating or control variables that can affect or clarify differences in mental health among study participants. In addition, the study identifies contextual variables, such as stigma and limited access to mental health services, as important background variables affecting overall mental health but notes that the primary focus of the study is on measurable correlations between physical activity and mental health outcomes. The Biopsychosocial Model guides the study, examining how physical activity, combined with demographic and contextual variables, influences mental health in this population [21].

2. Methods

2.1 Research Design

The study used a quantitative research design, a descriptive-correlational approach. The approach assessed the physical activity and mental health status of Filipino young adult's respondents relating to their age, gender, employment status, educational attainment, and number of hours spent engaging in physical activity. The correlational approach determined the relationship between physical activity and mental well-being of respondents about depression and anxiety.

2.2 Respondents

Out of the one hundred invites sent, sixty-five respondents took part using the researcher's established network in Bacolod City and consented to participate in the research. These primary participants were asked to refer and invite other young adults using snowball sampling.

2.3 Instrument

The researcher used standardized questionnaire to assess the physical activity and mental health status of respondents that are young Filipino adults residing in Bacolod City, Negros Occidental, Philippines. The questionnaire has three sets, PHQ-9 and GAD-7 was utilized for mental health status and International Physical Activity Questionnaire was used for the physical activity that the respondents engaged for about the time spent being physical active in the last 7 days.

2.4 Data Analysis

These results were collected using Spearman rank-order correlation coefficients, which were used to measure inter correlations between depression, anxiety, and physical activity levels. The study utilized data collected from the participants with the objective of determining the degree and direction of correlations between the variables. The researchers also ensured the ethical integrity of the study.

2.5 Data Collection Procedure

Respondents were randomly drawn from a pre-identified list of known contacts meeting the required criteria. The survey was conducted using Google Forms and transmitted via different media. Informed consent was obtained from all the respondents prior to data collection. After completing the survey, the respondents were emailed with a copy of their responses. Once the sixty-five respondents were attained, the data were sent to a statistician for analysis and tabulated in Excel for further analysis.

3. Results and Discussion

3.1 Demographic Profile of the Respondents

As shown in Table 1, the majority of the respondents were between 22 to 25 years old at 67.7% (n=44). A smaller portion were 26 to 30 years old, comprising 20.0% (n=13), while 7.7% (n=5) were 18 to 21 years old, and 4.6% (n=3) were 31 years old and above. In terms of gender, 49.2% (n=32) of the respondents were female, slightly outnumbering male respondents at 47.7% (n=31). A small portion, 3.1% (n=2), preferred not to disclose their gender. Regarding employment status, the majority were either employed full-time or part-time, making up 70.8% (n=46) of the sample. This was followed by those who were unemployed at 13.8% (n=9), students at 10.8% (n=7), and self-employed individuals at 4.6% (n=3). For educational attainment, a large proportion of respondents were college graduates or had postgraduate degrees, accounting for 70.8% (n=46). Meanwhile, 24.6% (n=16) had attended but not completed college, and 4.6% (n=3) had high school education as their highest level attained.

Table 1: Demographic Profile of the Respondents

Variable	n	%
Age		
18 to 21 years old	5	7.7
22 to 25 years old	44	67.7
26 to 30 years old	13	20.0
31 years old and above	3	4.6
Gender		
Male	31	47.7
Female	32	49.2
Prefer not to say	2	3.1
Employment Status		
Employed (Full Time/Part Time)	46	70.8
Unemployed	9	13.8
Student	7	10.8
Self-employed	3	4.6
Educational Attainment		
High School	3	4.6
College (Undergraduate)	16	24.6
College (Graduate/Postgraduate)	46	70.8
Whole	65	100.0

3.2 Level of Depression among Respondents

Table 2 presents the level of depression among respondents when grouped according to their demographic profiles. As a whole, the respondents exhibited a moderate level of depression (M=10.15, SD=5.05). When grouped by age, respondents 31 years old and above recorded the highest mean (M=13.33, SD=8.08), followed by those aged 26 to 30 years old (M=10.69, SD=5.09), both indicating a moderate level of depression. Respondents aged 22 to 25 years old exhibited a mild level (M=9.89, SD=5.09), while those aged 18 to 21 years old had the lowest mean (M=9.20, SD=2.95), also in the mild range. In terms of gender, respondents who preferred not to disclose their gender had the highest level of depression (M=17.00, SD=2.83), categorized as moderately severe. Female respondents exhibited a moderate level (M=10.44, SD=5.29), while male respondents reported a mild level (M=9.42, SD=4.64). For employment status, the self-employed had the highest depression level (M=11.00, SD=6.56), followed by the unemployed (M=10.33, SD=3.94) and those employed full-time or part-time (M=10.17, SD=5.46), all falling within the moderate range. Students had the lowest depression level (M=9.43, SD=3.55), interpreted as mild. With regard to educational attainment, respondents with high school education reported the highest mean (M=12.33, SD=2.89), followed by college graduates or those with postgraduate degrees (M=10.57, SD=5.49), both reflecting a moderate level. Those who attended college but had not graduated reported a mild level of depression (M=8.56, SD=3.61). These findings suggest that depression levels tend to increase with age and are more prominent among those with lower educational backgrounds, those who are self-employed, and those who prefer not to disclose their gender.

Table 2: Level of Depression among Respondents

Variable	M	SD	Interpretation
Age			
18 to 21 years old	9.20	2.95	Mild
22 to 25 years old	9.89	5.09	Mild
26 to 30 years old	10.69	5.09	Moderate
31 years old and above	13.33	8.08	Moderate
Gender			
Male	9.42	4.64	Mild
Female	10.44	5.29	Moderate
Prefer not to say	17.00	2.83	Moderately Severe
Employment Status			
Employed (Full Time/Part Time)	10.17	5.46	Moderate
Unemployed	10.33	3.94	Moderate
Student	9.43	3.55	Mild
Self-employed	11.00	6.56	Moderate
Educational Attainment			
High School	12.33	2.89	Moderate
College (Undergraduate)	8.56	3.61	Mild
College (Graduate/Postgraduate)	10.57	5.49	Moderate
Whole	10.15	5.05	Moderate
Mean Range: 0.00-4.99=Minimal, 5.00-9.99=Mild, 10.00-14.99=Moderate, 15.00-19.99=Moderately Severe, 20.00-27.00=Severe			

3.3 Level of Anxiety among Respondents

Table 3 presents the level of anxiety among respondents when grouped according to their demographic profiles. As a whole, the respondents exhibited a mild level of anxiety (M=8.26, SD=4.87). When grouped by age, respondents aged 31 years old and above reported the highest mean level of anxiety (M=11.33, SD=6.35), which falls within the moderate range. Respondents aged 26 to 30 years old also showed a relatively higher level (M=9.08, SD=5.98), while those aged 22 to 25 years old (M=7.84, SD=4.51) and 18 to 21 years old (M=8.00, SD=4.74) demonstrated mild levels of anxiety. In terms of gender, female respondents reported a slightly higher anxiety level (M=8.69, SD=5.35) compared to male respondents (M=7.77, SD=4.51). Respondents who preferred not to disclose their gender had an anxiety mean of (M=9.00, SD=2.83). All gender groups were classified within the mild level of anxiety. With respect to employment status, self-employed respondents reported the highest anxiety level (M=11.33, SD=8.74), interpreted as moderate, followed by those who were employed (M=8.39, SD=4.93), unemployed (M=7.78, SD=4.68), and students (M=6.71, SD=2.93), all of whom were categorized as having a mild level of anxiety. Regarding educational attainment, respondents with high school education showed a moderate level of anxiety (M=12.33, SD=4.04). In contrast, both college undergraduates (M=6.56, SD=4.26) and college graduates/postgraduates (M=8.59, SD=4.98) demonstrated mild levels of anxiety. These findings suggest that anxiety levels tend to be higher among older respondents, the self-employed, and those with lower levels of educational attainment. Nonetheless, across most demographic groups, anxiety remained within the mild range.

Table 3: Level of Anxiety among Respondents

Variable	M	SD	Interpretation
Age			
18 to 21 years old	8.00	4.74	Mild
22 to 25 years old	7.84	4.51	Mild
26 to 30 years old	9.08	5.98	Mild
31 years old and above	11.33	6.35	Moderate
Gender			
Male	7.77	4.51	Mild
Female	8.69	5.35	Mild
Prefer not to say	9.00	2.83	Mild
Employment Status			
Employed (Full Time/Part Time)	8.39	4.93	Mild
Unemployed	7.78	4.68	Mild
Student	6.71	2.93	Mild
Self-employed	11.33	8.74	Moderate
Educational Attainment			
High School	12.33	4.04	Moderate
College (Undergraduate)	6.56	4.26	Mild
College (Graduate/Postgraduate)	8.59	4.98	Mild
Whole	8.26	4.87	Mild
Mean Range: 0.00-4.99=Minimal, 5.00-9.99=Mild, 10.00-14.99=Moderate, 15.00-21.00=Severe			

3.4 Level of Physical Activity (MET-Minutes per Week) Among Respondents

Table 4 presents the level of physical activity among respondents, measured in MET-minutes per week, based on their demographic characteristics. As a whole, the respondents demonstrated a high level of physical activity (M=5287.20, SD=3619.88). By age group, the 22 to 25 years old respondents reported the highest level of physical activity (M=5967.07, SD=3823.67), followed closely by those aged 18 to 21 years old (M=5271.00, SD=4396.07). The 26 to 30 years old group (M=3450.92, SD=1693.95) and those 31 years old and above (M=3300.00, SD=3330.73) also reported high activity levels. Across gender, respondents who preferred not to disclose their gender exhibited the highest physical activity levels (M=7150.50, SD=7324.92), followed by male (M=5889.58, SD=3782.78) and female respondents (M=4587.19, SD=3221.97). All gender groups were classified within the high range of physical activity. When grouped by employment status, students reported the highest mean physical activity level (M=9510.43, SD=4645.72), which was more than twice that of any other group. This was followed by the self-employed (M=5379.00, SD=2541.77), unemployed (M=5155.33, SD=3321.35), and those employed (M=4664.35, SD=3214.82). All employment groups reported high levels of activity. In terms of educational attainment, college undergraduates exhibited the highest physical activity levels (M=8293.31, SD=4141.62), followed by those with a high school education (M=4108.00, SD=2456.69) and college graduates/postgraduates (M=4318.50, SD=2895.72). All education levels fell within the high physical activity classification. These findings suggest that most respondents across all demographic categories are engaging in high levels of physical activity, with particularly elevated levels observed among younger individuals, students, and those with lower levels of educational attainmen.

Table 4: Level of Physical Activity (MET-Minutes per Week) Among Respondents

Variable	M	SD	Interpretation
Age			
18 to 21 years old	5271.00	4396.07	High
22 to 25 years old	5967.07	3823.67	High
26 to 30 years old	3450.92	1693.95	High
31 years old and above	3300.00	3330.73	High
Gender			
Male	5889.58	3782.78	High
Female	4587.19	3221.97	High
Prefer not to say	7150.50	7324.92	High

Employment Status			
Employed (Full Time/Part Time)	4664.35	3214.82	High
Unemployed	5155.33	3321.35	High
Student	9510.43	4645.72	High
Self-employed	5379.00	2541.77	High
Educational Attainment			
High School	4108.00	2456.69	High
College (Undergraduate)	8293.31	4141.62	High
College (Graduate/Postgraduate)	4318.50	2895.72	High
Whole	5287.20	3619.88	High
Mean Range: 0.00-599.99=Low, 600.00-2999.99=Moderate, 3000.00 and above=High			

3.5 Correlation between Depression, Anxiety, and Physical Activity (MET-Minutes per Week)

Table 5 presents the Spearman rank-order correlation coefficients examining the relationships between depression, anxiety, and physical activity levels (measured in MET-minutes per week) among the respondents. A significant positive correlation was found between depression and anxiety [rs(63)=0.759, p=0.000], indicating that higher levels of depression are associated with higher levels of anxiety. However, no significant correlation was found between depression and physical activity [rs(63)=–0.205, p=0.102], as well as between anxiety and physical activity [rs(63)=–0.210, p=0.093]. These results suggest that while depression and anxiety are strongly interrelated, neither is significantly associated with the level of physical activity among the respondents.

Table 5: Correlation between Depression, Anxiety, and Physical Activity (MET-Minutes per Week)

Variable	r_s	df	p
Depression x Anxiety	0.759*	63	0.000
Depression x MET-minutes per week	-0.205	63	0.102
Anxiety x MET-minutes per week	-0.210	63	0.093
Note: *correlation is significant when p≤ 0.05			

4. Conclusion

This study clarifies the understanding of physical activity on the mental condition of Filipino youths. This study identifies increased physical activity and reduced incidents of depression and anxiety. Gender, employment status, and educational level also affect these findings, consistent with the complex nature of the mental health issues experienced by the participants in the study, which are the variables that were utilized in this study. Findings based on this study uphold the claim that physical activity positively affects the mental health issues of Filipinos. Furthermore, the study suggests that greater access to the provision of mental health care and the reduction of stigma can contribute to better mental health outcomes.

5. Limitation of the Findings

This study is limited to Bacolod City, Negros Occidental, and might not capture the heterogeneity of all Filipino young adults. The study's results were based on self-reported information, which might be subject to biases related to social desirability or recall of memory. The study did not consider other relevant variables, such as socio-economic status and specific mental health treatments, which might have given a better understanding of the state of mental health among this group of people. Additionally, the sample size and demographic makeup chosen in the study might also not be reflective of the heterogeneity of Filipino young adults.

6. Practical Value of the Paper

The study is useful with the findings that has considerable outcomes for undertakings focusing on enhancing the psychological health of Filipino youth adults. With the empirical basis for the positive impacts of physical activity on mental health, the current study can be of considerable use to healthcare practitioners, educators, and policymakers who champion physical activity as a critical component in treating mental health conditions. Additionally, the findings can be of significant use to mental health clinics, schools, and recreation centers in Bacolod and the like, thus helping integrate physical activity into the mental health programs for youths in such areas. This study also provides critical evidence for formulating culturally sensitive health interventions addressing physical and mental health issues.

7. Directions for Future Research

This study undergone quantitatively investigative efforts to include a more heterogeneous and expanded sample of Filipino young adults, with care taken to ensure that respondents may be able to represent a range of socio-economic statuses and geographic locations. It is important to consider a range of factors, including diet, supportive family dynamics, and targeted mental health treatments, to build a more complete understanding of mental health. For follow-up inquiries to be most effective, the use of mixed methodologies is suggested; combining quantitative information with qualitative, open-form interviews will allow scholars to draw more informed interpretations of the complex interplay between physical activity and perceived mental health among young adults. Longitudinal methods are of particular benefit in studying the dynamic flow and evolution of physical activity over time and its resultant effect on the expression of mental health in this given subgroup of the population.

8. Declaration of Conflict of Interest

The researcher involved in the current study maintains that there are no conflicts of interest regarding the preparation, review, or dissemination of the current research. All the findings and conclusions presented in the current study are based on the authors' individualized inquiry and analysis. No financial, personal, or professional interests influence the findings or explanations developed in the current research.

9. References

1. Mahindru A, Patil P, Agrawal V. Role of Physical Activity on Mental Health and Well-Being: A Review. Cureus. 2023 Jan;15(1):e33475. DOI: 10.7759/cureus.33475.
2. Martín-Rodríguez A, Gostian-Ropotin LA, Beltrán-Velasco AI, Belando-Pedreño N, Simón JA, López-Mora C, *et al*. Sporting Mind: The Interplay of Physical Activity and Psychological Health. Sports. 2024 Jan;12(1):37. DOI: 10.3390/sports12010037.
3. Granero-Jiménez J, López-Rodríguez M, Dobarrio-Sanz I, Cortés-Rodríguez AE. Influence of Physical Exercise on Psychological Well-Being of Young Adults: A Quantitative Study. Int J Environ Res Public Health. 2022 Apr;19(7):4282. DOI: 10.3390/ijerph19074282.
4. Herbert C. Enhancing Mental Health, Well-Being and

Active Lifestyles of University Students by Means of Physical Activity and Exercise Research Programs. Front Public Health. 2022 Mar;10:849093. DOI: 10.3389/fpubh.2022.849093.
5. Wang C, Tee M, Roy AE, Fardin MA, Srichokchatchawan W, *et al*. The impact of COVID-19 pandemic on physical and mental health of Asians: A study of seven middle-income countries in Asia. PLoS ONE. 2021 Feb;16(2):e0246824. DOI: 10.1371/journal.pone.0246824.
6. Diaz FC, Trinidad I, Agustin MJ, Panganiban TP, Garcia MB. Mindfulness for Health and Well Being. In: Emerging Trends in Mental Health and Wellness. IGI Global; 2024. p. 139–168. DOI: 10.4018/979-8-3693-3952-7.ch006.
7. Broglia E, Millings A, Barkham M. Student mental health profiles and barriers to help seeking: When and why students seek help for a mental health concern. Couns Psychother Res. 2021 Dec;21(4):816–26. DOI: 10.1002/capr.12462.
8. Leonte N, Tudorancea ȘD, Vasilescu F. The Impact of Using Modern Fitness Techniques vs. the Traditional Ones on the Strength of the Lower Limbs in Adolescent Girls. Rev Romaneasca Pentru Educatie Multidimensionala. 2021 Jun;13(2):407–22. DOI: 10.18662/rrem/13.2/428.
9. Campoamor-Olegario L, Camitan DS, Guinto MLM. Beyond the pandemic: physical activity and health behaviors as predictors of well-being among Filipino tertiary students. Front Psychol. 2025 Jan;16:1490437. DOI: 10.3389/fpsyg.2025.1490437.
10. Mercado RT, Amurao EA, Panlilio JC. The Filipino Work Values of Young Professionals in the Province of Tarlac, Philippines. Rev Integr Bus Econ Res. 2024;13:315–28.
11. Palad YY, Guisihan RM, Aguila MER, Ramos RA, Cagas JY. An Evaluation of Policies Promoting Physical Activity among Filipino Youth. Int J Environ Res Public Health. 2023 Feb;20(4):2865. DOI: 10.3390/ijerph20042865.
12. Kurata YB, Ong AK, Cunanan AL, Lumbres AG, Palomares KG, Vargas CD, *et al*. Perceived Behavior Analysis to Boost Physical Fitness and Lifestyle Wellness for Sustainability among Gen Z Filipinos. Sustainability. 2023 Sep;15(18):13546. DOI: 10.3390/su151813546.
13. Esto JB, Java VP, Elumaring JB, Tagare RL, Martinez ND, Rosario MA, *et al*. Stepping Towards Growth: Examining the Relationship Between Physical Activity Engagement and Personal Growth Initiative Among Filipino Students. Int J Hum Mov Sports Sci. 2025 Apr;13(2):435–42. DOI: 10.13189/saj.2025.130221.
14. Speyer H, van Os J. Engaging in healthy life activities is inherently valuable. Lancet Psychiatry. 2024 Jun;11(6):398–9. DOI: 10.1016/S2215-0366(24)00131-7.
15. Smye V, Browne AJ, Josewski V, Keith B, Mussell W. Social Suffering: Indigenous Peoples' Experiences of Accessing Mental Health and Substance Use Services. Int J Environ Res Public Health. 2023 Feb;20(4):3288. DOI: 10.3390/ijerph20043288.
16. Sergeyev D, Lian C, Gorodnichenko Y. The Economics of Financial Stress. Rev Econ Stud. 2024 May;rdae110. DOI: 10.1093/restud/rdae110.
17. Azlan A, Ismail N, Fauzi NF, Talib RA. Playing traditional games vs. Free-play during physical education lesson to improve physical activity: A comparison study. Pedagogy Phys Cult Sports. 2021 Jun;25(3):178–87. DOI: 10.15561/26649837.2021.0306.
18. Maravilla MA, Tan MJ. Philippine Mental Health Act: Just an Act? A Call to Look Into the Bi-directionality of Mental Health and Economy. Front Psychol. 2021 Jul;12:706483. DOI: 10.3389/fpsyg.2021.706483.
19. Van Sluijs EM, Ekelund U, Crochemore-Silva I, Guthold R, Ha A, Lubans D, *et al*. Physical activity behaviours in adolescence: current evidence and opportunities for intervention. Lancet. 2021 Jul;398(10298):429–42. DOI: 10.1016/S0140-6736(21)01259-9.
20. Zhang WH, Yuan Q, Cai H. Unravelling urban governance challenges: Objective assessment and expert insights on livability in Longgang District, Shenzhen. Ecol Indic. 2023 Oct;155:110989. DOI: 10.1016/j.ecolind.2023.110989.