Prevalence and Injury Risk Factors based on Sleman Health and Demographic Surveillance System (HDSS) Data

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Abstract

Background: Injuries can occur in various groups of individuals with various risk factors and complications. Health problems due to injuries will put a burden on the victims' individuals and families, health services, health insurance, even various parties related to the work productivity of victims. The analysis of injury risk factors is an initial effort for injury prevention efforts which are expected to avoid reducing productivity and quality of life of individuals. Problem: Need to explore and analyze risk factors for injury, including demographic profile. Objective: The research to be carried out to determine the prevalence of injury cases and risk factors. Methods: This study used a cross-sectional observational design. The data used is secondary data from HDSS Sleman. Research subjects were all injury cases recorded in the Sleman HDSS document. Statistical analysis was performed to calculate prevalence and see the strength of the relationship between risk factors and the incidence of injury. Results: Males had an accident 54%, in 2017, it rose to 56%, and in 2019 it dropped to 55%. In 2016, adults suffered 48% injuries, then decreased to 38% and 36% in the next cycle. In 2016, the number of bruises and abrasions was 72%, and decreased in the next two cycles of 67% and 58%. Part of the body that was most often affected by injury during three cycles was the upper limb. Conclussion : Continued research on injuries and associated risk factors, needs to be done to create health surveillance data.

Key word : *injury, risk factor, prevalence, accident, trauma, surveillance, HDSS*

Background

Injury is an event that can befall anyone in a variety of situations and places, both with deliberate and accidental elements. Injury events are caused and influenced by many factors, external and internal. The consequences also vary.[1] Drug and alcohol consumption can also influence a person to get involved in a fight. Involvement in gang activities and drug trafficking also increases the incidence of murder. Regions with high unemployment have a tendency for homicides to be high.[1]

Intentions cause injury, can also originate from within the individual. Attempted suicide is one of them. Countries with lower middle-income countries (or low-and-middle income countries or LMIC) in Southeast Asia in 2012 had the highest suicide rates among other countries with lower middle income. Globally suicide rates in LMIC occur mostly in the 30-49 year age group, whereas in countries with high incomes the most are at the age of 15-29 years. The incidence of suicide increases with increasing age in the elderly group.[2] The incidence of suicide is more dominated by men than women.[2–4]

Accidents are the cause of injury cases. The causes of accidents differ between age groups. Accidents are even the most unnatural method of death in the elderly.[4,5] Elderly people are more prone to injury because of declining health and dependence on others. Most cases of injury causing death in the elderly are traffic accidents, followed by falls, and poisoning.[6] The most common cause of injury due to accidents in children is falls and is followed by bites.[7] Accidents also differ in pattern between urban and urban areas. The risk of suicide in urban areas is influenced by marital status, income, ethnicity, and psychiatric status.[8] Based on the

level of education, the higher the level of education the lower the suicide rate.[2]

A cohort study by Fukuchi et al. (2013) in Japan showed that individuals who committed suicide mostly married marital status, although after hazard hazard calculation was performed, unmarried marital status had the highest HR. Research Ponnudurai and Jeyakar (1980) getting married is not a protective factor for women. Getting married makes even women more vulnerable to suicidal behavior in Asia. The underlying stress is associated with young marriages, low socioeconomic status, domestic violence, and economic dependence.[9]

The use of alcohol and narcotics such as cocaine can increase the risk of death from injury in accidents.[10] Fracture is one of the factors that increase mortality due to falls, the prevalence is different between urban and rural areas. Findings of fracture cases in urban areas show lower bone density in the elderly compared to rural areas.[11] Urban areas have higher traffic accident rates than rural areas.[12,13] Research Malik et al. (2017) found traffic accident as one of the highest contributors to injury rates with a proportion of 25% occurring in rural areas and 74% in urban areas.[14] Indonesia is one of the countries that has the highest number of two-wheeled accidents. Accidents are often found in middle and low income countries because the high number of vehicles is not followed by firmness in enforcing policies regarding vehicle and driving standards, including the lack of infrastructure devoted to cyclists and pedestrians.[16]

Subjects who work have a higher risk of having an accident while working and also an accident while traveling to and from work. According to Hartley and Arnold (1996) individuals who work and engage in traffic accident have a history of work-related fatigue.[17] Research Fazel et al. (2012) found that individuals who did not work spent more time at home, so that they were more likely to have an accident at home.[18] Housewives have a higher risk of injury and death due to accidents at home.[15]

Research Method

This study uses an observational cross-sectional design. The data used is secondary data from HDSS Sleman. Research subjects were all injury cases recorded in the Sleman HDSS document. Sampling in this study took all existing cases (total sampling). The inclusion criteria in this study were injury cases recorded in the Sleman HDSS document. Exclusion criteria are subject data with incomplete risk factors. The sample size of this study was 1676 people and was followed up in three years. The duration of this study was 3 cycle (2016, 2017, and 2019).

Result

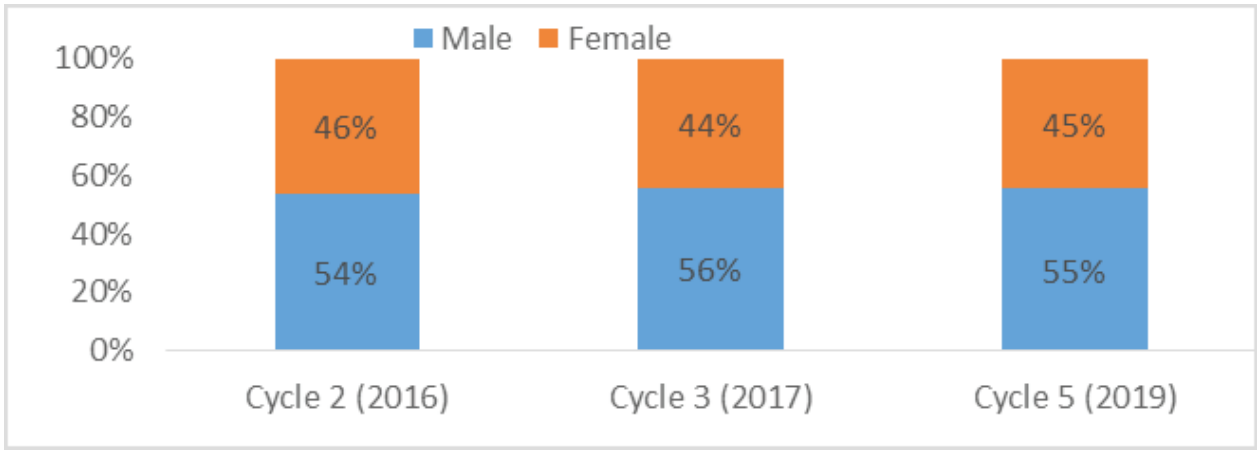

Figure 1. Injury by Gender

Based on Figure 1, in 2016, males had an accident 54%, in 2017, it rose to 56%, and in 2019 it dropped to 55%. Whereas women, in 2016 had accidents by 46%, then dropped to 44% in 2017, and rose again in 2019 by 55%.

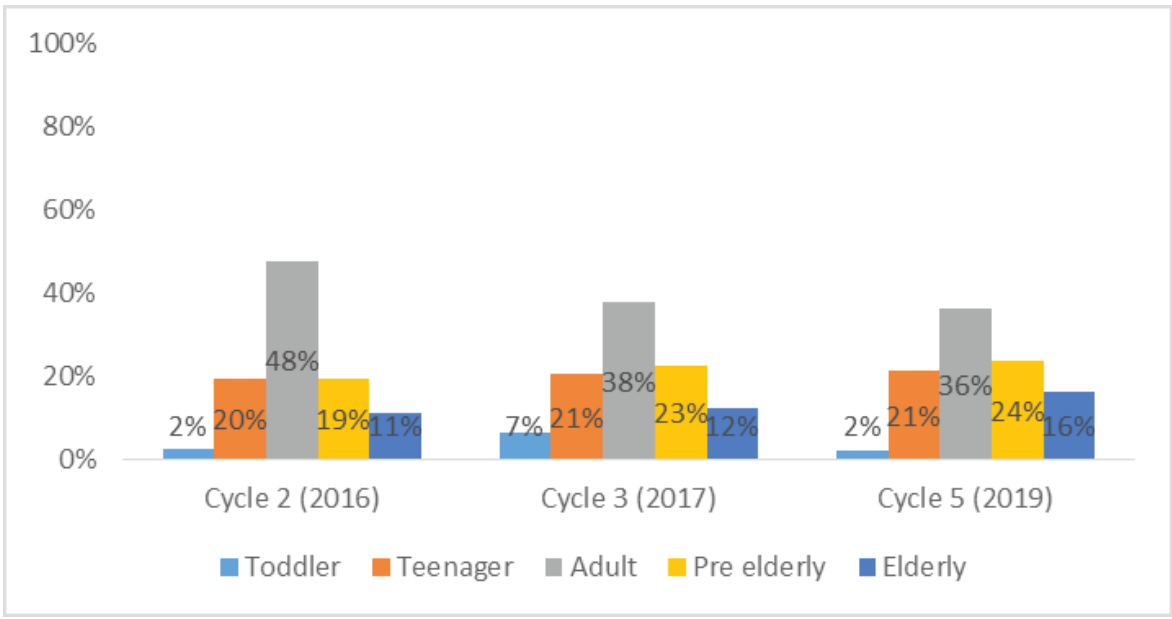

Figure 2. Injury by Age

Based on Figure 2, from year to year, adulthood has the highest frequency of injury. In 2016, adults suffered 48% injuries, then decreased to 38% and 36% in the next cycle. In 2016, teenager were ranked second highest after adulthood. Whereas in 2017 and 2019, pre-elderly were ranked 2. In the third year, the next highest frequency was pre-elderly, and the least was toddler.

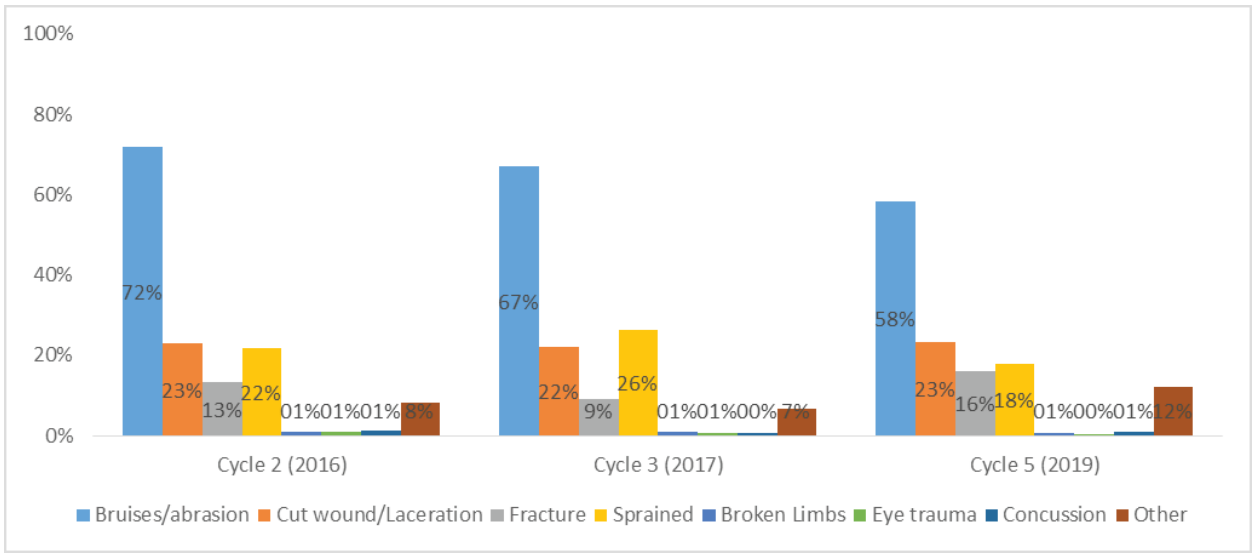

Figure 3. Injury by Kind of Injury

Bruises and abrasion ranks highest in this type of injury. In 2016, the number of bruises and abrasions was 72%, and decreased in the next two cycles of 67% and 58%. In 2016 and 2019, cut wound and laceration occupy the second highest place. Whereas in 2017, sprained occupies the second highest place. At all years, the third most frequent frequency is fracture, followed by other causes.

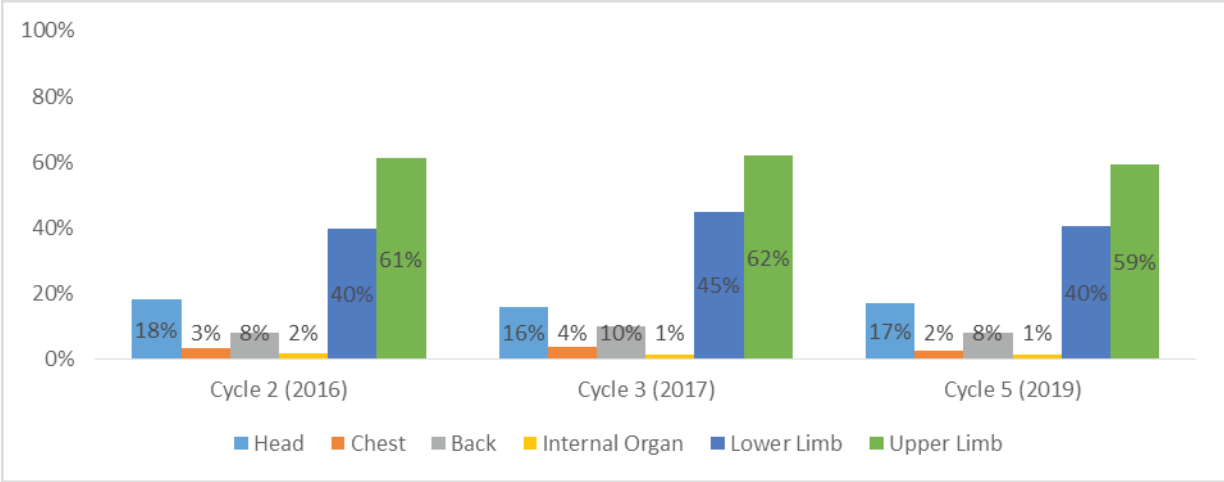

Figure 4 Injury by Organ Damage

Part of the body that was most often affected by injury during three cycles was the upper limb. The frequency in 2016 was 61%, then it increased to 62% in the following year, and in 2019 it fell to 59%. The second highest limb to be injured was lower limb, followed by the head, and other limbs. The frequency of injuries in the lower limb in 2016, as much as 40%, in the following year to 45% and down again to 40%.

Discussion

Based on the the data of Sleman HDSS, prevalence of injury is 3.8% in 2016, 5.1% in 2017 and 3.5% in 2019. Higher prevalence was found in 2017. Extreme weather in 2017 influenced some disasters was noted in Province Disaster Management Team. Injury in men is higher than women (Figure 1). This study is in line with research in Germany, which states that men have a risk of 77.5% for injury.[18] This is because men experience more traffic accidents, exercise, and do heavy work compared to women. In traffic accidents, the classification includes pedestrians (14.37%), vehicles (38.36%), motorcyclists (43.37%), and 3.9% of users injured with other vehicles. men drive vehicles more than women.[13]

Many adults experience injuries, due to high work mobility, and high risk of injury in terms of work (Figure 2). Research in Germany states that the productive age of 40.1 to 49.5 years has the most injuries.[18] While research in Iran, the peak of accidents at the age of 33 years, this is consistent with the results of the study.[13] After adult, in the age group of pre-elderly and also teenagers there are many accidents. Pre-elderly is associated with a high risk of falling due to bodily imbalance, whereas in adolescents due to high carelessness in driving a vehicle.[12]

Based on the the data of Sleman HDSS, in 2016, 2017 and 2019 (Figure 3), abrasion and bruises was the most common injury caused by trauma. These results were in line with a study in Klaten, Central Java, showing that blunt trauma was the highest trauma. abrasion and bruises was the most common type of injury in a traffic accident. Abrasion and bruises is a type of injury that often arises because the force required to cause the injury is weak to moderate energy.[19]

Based on HDSS data from the three cycles (Figure 4), the limb with the most injuries is the upper limb followed by the lower limb. This study is the same as the results of research conducted in Yemen, which states the upper and lower limbs of the most common sites of injury.[20] Another study, stated that injuries that occur most in the upper limb followed by lower limb and facial. This is because the part is the part most exposed to the outside so it is most at risk for trauma.[21]

Based on the the data of Sleman HDSS, in 2016, 2017 and 2019, it has been discussed that most injuries occur in men and in their productive age. However, we can see that old age has a 0.18 times greater risk of injury, and this is statistically significant (p=0.02). Physiological response in the elderly has been reduced at this time, in addition to the strength of the tissue in holding the force that comes also decreases. This is what causes elderly requires intensive monitoring and

aggressive management in response to injury.[22]

Lower education experiences a higher incidence of injury. This is due to lack of adequate education, resulting in a lack of knowledge. Educational interventions need to be done to increase knowledge, so that it will improve human compliance in using self-protection tools. In addition, education is also important to improve the ability to identify the sources of injury and increase alertness to avoid it.[23]

Among all the jobs available, private sector is the highest frequency of injury among others. Private sector is private industries and services are owned or controlled by an individual person or a commercial company, rather than by the state or an official organization. The private sector covers a wide range of work fields, including work that takes a lot of energy in the field, for example in the field of building construction. Work in the field carries a high risk of injury. The use of adequate personal protective equipment is very important in the context of preventing injury.[24]

Road accidents are the most frequent accidents, and motorbikes are the types of vehicles that have the most accidents. The use of helmets that are not standardized increases the risk of accidents. The results of this study are in line with the results of studies in India, which states the motorbike is the vehicle with the most accidents.[21]

Conclussion

Based on HDSS data, most injuries occur in men and in their productive age. Many adults experience injuries, then abrasion and bruises was the most common injury caused by trauma. The limb with the most injuries is the upper limb followed by the lower limb.Lower education experiences a higher incidence of injury. Private sector is the highest frequency of injury among others. Road accidents are the most frequent accidents, and motorbikes are the types of vehicles that have the most accidents. The use of helmets that are not standardized increases the risk of accident. Continued research on injuries and associated risk factors, needs to be done to create health surveillance data.

Conflict of Interest NIL

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Refferences

1. Izadi N, Mirtorabi SD, Najafi F, Nazparvar B, Nazari Kangavari H, Hashemi Nazari SS. Trend of years of life lost due to suicide in Iran (2006-2015). Int J Public Health. 2018 Nov;63(8):993–1000.
2. Kim JW, Jung HY, Won DY, Shin YS, Noh JH, Kang TI. Landscape of Elderly Suicide in South Korea: Its Trend According to Age, Gender, and Educational Attainment. Omega (Westport). 2018 Oct 25;0030222818807845.
3. Donath C, Bergmann MC, Kliem S, Hillemacher T, Baier D. Epidemiology of suicidal ideation, suicide attempts, and direct self-injurious behavior in adolescents with a migration background: a representative study. BMC Pediatrics [Internet]. 2019 Dec [cited 2020 Apr 10];19(1). Available from: https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-019-1404-z
4. Abramsky T, Watts CH, Garcia-Moreno C, Devries K, Kiss L, Ellsberg M, et al. What factors are associated with recent intimate partner violence? findings from the WHO multi-country study on women's health and domestic violence. BMC Public Health [Internet]. 2011 Dec [cited 2020 Apr 10];11(1). Available from: http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-11-109
5. Kumar S, Verma AK. A study of elderly unnatural deaths in medico-legal autopsies at Lucknow locality. Med Sci Law. 2014 Jul;54(3):127–31.
6. Vadysinghe AN, Senasinghe P, Sivasubramanium M, Jayasooriya P, Premarathna BG, Rathnayake RMISD, et al. Unnatural Deaths of the Elderly Population of Sri Lanka: A Descriptive Analysis. Am J Forensic Med Pathol. 2018 Jun;39(2):148–51.
7. Mishra KK, Gupta N, Bhabulkar S. Sociodemographic profile of suicide attempters among the rural agrarian community of central India. Industrial Psychiatry Journal. 2015 Jul 1;24(2):185.
8. Qin P. Suicide risk in relation to level of urbanicity-

-a population-based linkage study. Int J Epidemiol. 2005 Aug;34(4):846–52.

9. Fukuchi N, Kakizaki M, Sugawara Y, Tanji F, Watanabe I, Fukao A, et al. Association of marital status with the incidence of suicide: A population-based Cohort Study in Japan (Miyagi cohort study). Journal of Affective Disorders. 2013 Sep 25;150(3):879–85.
10. Tumram NK, Ambade VN, Dixit PG. Human fatalities caused by animal attacks: A six-year autopsy study. Med Leg J. 2017 Dec;85(4):194–9.
11. Pongchaiyakul C, Nguyen TV, Kosulwat V, Rojroongwasinkul N, Charoenkiatkul S, Rajatanavin R. Effect of urbanization on bone mineral density: A Thai epidemiological study. BMC Musculoskeletal Disorders [Internet]. 2005 Dec [cited 2020 Apr 10];6(1). Available from: http://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/1471-2474-6-5
12. Yu P-L, Qin Z-H, Shi J, Zhang J, Xin M-Z, Wu Z-L, et al. Prevalence and related factors of falls among the elderly in an urban community of Beijing. Biomed Environ Sci. 2009 Jun;22(3):179–87.
13. Roshanfekr P, Malek Afzali Ardakani H, Sajjadi H, Khodaei-Ardakani M-R. Social Differences in the Prevalence of Road Traffic Injuries among Pedestrians, and Vehicle and Motorcycle Users in Iran: Results of a National Multiple Indicator Demographic and Health Survey (IrMIDHS, 2010). Int J Prev Med [Internet]. 2019 Jun 7 [cited 2020 Apr 10];10. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6592099/
14. Malik R, Atif I, Rashid F, Abbas M. An analysis of 3105 Medico Legal Cases at Tertiary Care Hospital, Rawalpindi. Pakistan Journal of Medical Sciences [Internet]. 2017 Aug 4 [cited 2020 Apr 10];33(4). Available from: http://pjms.com.pk/index.php/pjms/article/view/11696
15. Yoo JS, Kim CG, Yim J, Jeon MY. Factors influencing falls in the frail elderly individuals in urban and rural areas. Aging Clin Exp Res. 2016 Aug;28(4):687–97.
16. Pal A, Gin KY-H, Lin AY-C, Reinhard M. Impacts of emerging organic contaminants on freshwater resources: Review of recent occurrences, sources, fate and effects. Science of The Total Environment. 2010 Nov;408(24):6062–9.
17. Hartley L, Arnold PK, Transport MUI for R into S&. Management of fatigue in the road transport industry : recommendations from the Second International Conference on Fatigue in Transportation, Fremantle, Western Australia, 1996 [Internet]. [Murdoch, W.A.] : Institute for Research in Safety & Transport, Murdoch University; 1996 [cited 2020 Apr 10]. Available from: https://trove.nla.gov.au/version/18497472
18. Paffrath T, Lefering R, Flohé S. How to define severely injured patients?—An Injury Severity Score (ISS) based approach alone is not sufficient. Injury. 2014 Oct;45:S64–9.
19. Putrapratama P, Arfianti Wiraagni I, Suciningtyas Tri Artanti M. Study of Traffic Accident Cases Based on Visum et Repertum in RSUP Dr. Soeradji Tirtonegoro Klaten Hospital During 2014-2016. International Journal of Medical Toxicology and Forensic Medicine. 2017 Aug 1;7(3(Summer)):171–6.
20. Al-Thaifani AA, Al-Rabeei NA, Dallak AM. Study of the Injured Persons and the Injury Pattern in Road Traffic Accident in Sana'a City, Yemen. Advances in Public Health. 2016;2016:1–5.
21. D.K. Srinivasa, Gautam Roy, S. Jagdish NJ. Injury Pattern among Road Traffic Accident Cases : A Study from South India. Indian Journal of Community Medicine. 2003;28(2):7.
22. Victorino GP, Chong TJ, Pal JD. Trauma in the Elderly Patient. ARCH SURG. 2003;138:6.
23. Silva ECS, Fernandes MN de F, Sá MCN, Mota de Souza L, Gordon AS de A, Costa ACP de J, et al. The Effect of Educational Intervention Regarding the Knowledge of Mothers on Prevention of Accidents in Childhood. The Open Nursing Journal. 2016 Jul 29;10(1):113-21.
24. Sarker NI, Sultana A, Prodhan AS. Job satisfaction of employees of public and private organizations in Bangladesh. :9.