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Evaluation of Fatty Acid Synthase as a Molecular Target for Stress-Dependent Fungicidal Activity of 1-Geranylgeranylpyridinium

By Takeshi Doi, Shintaro Miyuki, Yoshinosuke Usuki, Yoshihiro Yamaguchi, Ken-ichi Fujita, Akira Ogita & Toshio Tanaka

Osaka City University

Abstract- Among various isoprenoid compounds, 1-geranylgeranylpyridinium (GGPy) showed remarkable lethal effects on *Saccharomyces cerevisiae* cells similarly under hypo- and hyperosmotic conditions at 30°C. In addition to such osmotic stress, GGPy exhibited temperature-dependent lethal effects against *S. cerevisiae* and the pathogenic yeast *Candida albicans* at the human body temperature of 37°C. Fatty acid synthase (FAS) was identified as one of the GGPy-binding proteins and was considered a molecular target of GGPy in its inhibitory effect on the fungal stress adaptation. GGPy was not inhibitory to the activity of FAS assayed upon NADPH oxidation involved in acyl chain elongation by this multi-functional enzyme complex. Nevertheless, the lethality of GGPy was repressed in the medium where polyoxyethylene sorbitan monopalmitate (Tween 40) supplemented as the water-soluble and esterase-dependent source of palmitic acid. These findings may suggest that GGPy is permissive for acetyl unit incorporation into the growing chain of fatty acyl-CoA by FAS butis restrictive to its ultimate elongation to palmitoyl-CoA as a donor of the long-chain saturated fatty acid for the synthesis of stress-tolerant glycerophospholipids.

Keywords: *Saccharomyces cerevisiae; Candida albicans; fungal stress adaptation; geranylgeraniol derivative; fungicidal activity.*

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Abstract- Among various isoprenoid compounds, 1-geranylgeranylpyridinium (GGPy) showed remarkable lethal effects on *Saccharomyces cerevisiae* cells similarly under hypo- and hyperosmotic conditions at 30ºC. In addition to such osmotic stress, GGPy exhibited temperature-dependent lethal effects against *S. cerevisiae* and the pathogenic yeast *Candida albicans* at the human body temperature of 37ºC. Fatty acid synthase (FAS) was identified as one of the GGPy-binding proteins and was considered a molecular target of GGPy in its inhibitory effect on the fungal stress adaptation. GGPy was not inhibitory to the activity of FAS assayed upon NADPH oxidation involved in acyl chain elongation by this multi-functional enzyme complex. Nevertheless, the lethality of GGPy was repressed in the medium where polyoxyethylene sorbitan monopalmitate (Tween 40) supplemented as the water-soluble and esterase-dependent source of palmitic acid. These findings may suggest that GGPy is permissive for acetyl unit incorporation into the growing chain of fatty acyl-CoA by FAS butis restrictive to its ultimate elongation to palmitoyl-CoA as a donor of the long-chain saturated fatty acid for the synthesis of stress-tolerant glycerophospholipids.

Keywords: Saccharomyces cerevisiae; Candida albicans; fungal stress adaptation; geranylgeraniol derivative; fungicidal activity.

I. Introduction

Antifungal chemotherapy is currently very limited and dominated mainly by the classical antifungal agents such as azole class of ergosterol biosynthesis inhibitors and polyene macrolides that can bind with this neutral lipid (Pianalto and Alspaugh, 2016). New semisynthetic lipopeptide antifungal agents which is commonly known as micafungin and pneumocandin are recently used in the treatment of systemic fungal infectious diseases (Morrison, 2006). This class of agents inhibits fungal cell wall biosynthesis by targeting β-1, 3-glucan synthase. Rho1p is one of the fungal GTP-binding proteins in which C-terminal enables its plasma membrane association and the resulting activation of β-1, 3-glucan synthase (Inoue et al., 1999; Levin, 2005). Therefore, GGTase is considered an alternative target for the development of antifungal agents with an increased selectivity toward fungal cell wall biosynthesis (Murthi et al., 2003; Nishimura et al., 2009; Sunami et al., 2002).

Farnesol (FOH) is naturally-occurring isoprenoid alcohol with a shorter isoprenyl chain than geranylgeraniol (GGOH), which is also involved in protein prenylation as a result of pyrophosphorylation of the terminal hydroxyl group. We had found a marked antifungal activity of FOH in addition to the predominant apoptosis-inducing activity against various tissue-cultured mammalian cells (Machida et al., 1998; Machida and Tanaka, 1999; Voziyan et al., 2005). 1-Farnesylpyridinium (FPy, Fig. 1) is a newly synthesized derivative of FOH, is characterized by an extreme increase in the apoptosis-inducing activity especially against human leukemiacells (HL-60) (Hamada et al., 2002; Hamada et al., 2006). Such a hybrid structure of FPy generated a unique antifungal activity as judged by the transformation of the rod-shaped cell wall to the swollen spherical architecture in the fission yeast *Schizosaccharomyces pombe*. Isoprenoid may give us a novel type of antifungal agent as a result of the structural modification of its terminal hydroxyl group.

In this study, 1-geranylgeranylpyridinium (GGPy, Fig. 1) was newly synthesized as a possible inhibitor of GGTase, and its antifungal activity was evaluated based on the inhibitory activity on β-1, 3-glucan synthetic reaction. Unlike the cell wall-associated toxic event, however, GGPy exhibited a marked fungicidal activity similarly under low and high osmotic environments. We additionally found the thermal stress-dependent lethality of GGPy against the human pathogenic fungus *Candida albicans* at the human body temperature of 37°C. Fatty acid synthase (FAS) was identified as one of the GGPy-binding proteins, being considered a target for the newly detected stress-dependent fungicidal activity of GGPy.

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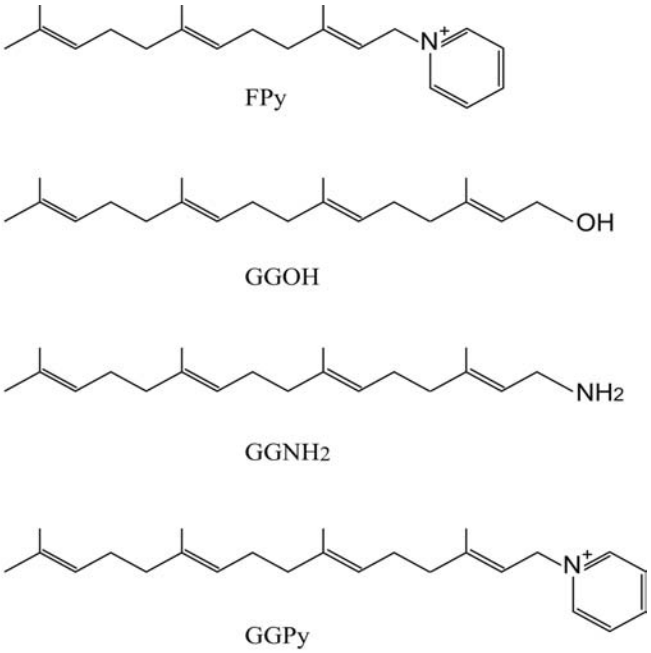

Fig. 1: Structures of isoprenoids and their derivatives

II. Materials and Methods

a) *Syntheses of isoprenoid-derivatives*

FPy, geranylgeranylchloride, and geranylgeranylamine ($GGNH_2$) were synthesized as previously described (Hamada et al., 2002; Tanaka et al., 2004). GGPy was synthesized by following the procedures for FPy synthesis, as described below. A mixture of pyridine (0.6 mmol, 48.5 μl) and geranylgeranylchloride (0.6 mmol, 180.6 μl) was heated at 80°C for 1 h. After cooling to room temperature, the reaction mixture was diluted with 1.0 ml of dichloromethane and applied onto a silica gel column (ø 3.0 × 5.0 cm), which had been equilibrated with this solvent. After washing the column with dichloromethane, stepwise elution was done by increasing methanol concentration in dichloromethane up to 7% (v/v). GGPy was eluted in the fraction consisting of 97% (v/v) dichloromethane and 3% (v/v) methanol and was finally isolated as a faintly reddish slimy liquid (113.9 mg) after evaporation of the organic solvent. The spectral data of GGPy were taken on a JEOL JNM-LA400 spectrometer in chloroform-d_1. Solvent signals at δ 7.24 ppm (^{1}H) and 77.0 ppm (^{13}C) were used as internal standards, and chemical shifts are expressed in δ values. GGPy: ^{1}H-NMR (600 MHz, $CDCl_3$) δ 1.556 (s, 9H), 1.640 (s, 3H), 1.880 (s, 3H), 1.919 – 2.026 (m, 8H), 2.134 (m, 4H), 5.050 (m, 3H), 5.477 (t, J = 7.4 Hz, 1H), 5.628 (d, J = 7.4 Hz, 2H), 8.064 (t, J = 6.6.Hz, 2H), 8.450 (t, J = 7.4 Hz, 1H), 9.358 (d, J = 5.6 Hz, 2H). 13C-NMR (150 MHz, $CDCl_3$) δ 16.00, 16.10, 17.25, 17.65, 25.66, 26.04, 26.61, 26.73, 39.55, 39.68, 59.32, 115.60, 122.92, 123.92, 124.30, 128.23, 131.27, 135.15, 136.18, 144.68, 144.96, 148.72. The FAB(+)-MS *m/z* spectrum value of 352.4 (M^+) detected with GGPy coincided with *m/z* 352.5963 calculated for $C_{25}H_{38}N$.

3-amino-GGPy was synthesized by following the method of GGPy synthesis except for the use of a mixture of 3-amino pyridine (0.6 mmol) and geranylgeranylchloride (0.6 mmol). 3-amino-GGPy was obtained as a faintly red-orange oily liquid, and its FAB (+)-MS *m/z* spectrum value of 367.5 coincided with *m/z* 367.5905 calculated for $C_{25}H_{39}N_2$.

b) *Measurement of yeast cell growth and viability*

Unless otherwise stated, *S. cerevisiae* W303-1A was used in the following experiments to examine the effects of FPy, GGOH, and its derivatives on cell growth and cell viability (Ogita et al., 2010). *C. albicans* NBRC 1061 was also used in addition to *S. cerevisiae* BY4741 and its glyceraldehyde 3-phosphate dehydrogenase (GAPDH) gene deletion mutant Δ*tdh1* (Yutani et al., 2011). Cells of these yeast strains were grown overnight in YPD medium, which contained (per liter) 10 g of yeast extract, 20 g of peptone, and 20 g of glucose, with vigorous shaking at 30°C. After dilution of the overnight-grown culture with distilled water (DW) to 10^7 cells/ml, cells were incubated without or with each compound in DW, YPD medium, and YPD medium containing 1.2 M D-sorbitol as an osmotic stabilizer. Viable cell number was determined by the methylene blue method or by counting colony-forming units after a 48-h incubation at 30°C in YPD medium containing 1.8% (w/v) agar (lida et al., 1990). Minimum growth inhibitory concentration (MIC) of GGPy was determined by the serial broth dilution method using a 96-well microplate, in which *S. cerevisiae* W303-1A cells were suspended at 10^6 cells/ml in YPD medium and incubated for 48 h at 30°C and 37°C.

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c) Purification of GGPy-binding proteins

To bind GGPy residue covalently to Sepharose 4B gel as a molecular ligand, ECH Sepharose™ 4B (2 g) was subjected to carbodiimide-mediated coupling with amino-GGPy (20 mg) in DW according to the direction of the supplier's manual (GM Healthcare). ECH Sepharose™ 4B was also treated with carbodiimide in the absence of amino-GGPy, and such chemically treated Sepharose 4B gel itself was used as a control for the detection of proteins, which are bound directly to Sepharose 4B column without GGPy as a ligand.

Overnight-grown cells of *S. cerevisiae* were inoculated into 200 ml of YPD medium and incubated with vigorous shaking at 30°C for 8 h. Without or with the additional incubation at 37°C for 1 h, the cells were collected by centrifugation and washed twice with phosphate-buffered saline (PBS) consisting of 137 mM NaCl, 8.10 mM $Na_2HPO_4{\cdot}12H_2O$, 2.68 mM KCl, and 1.47 mM KH_2PO_4. The finally obtained cell pellets were suspended in 5 ml of PBS. The yeast cells were then disrupted by repeated vortexing with glass beads, and the supernatant (200 μl) obtained by centrifugation was applied onto the column of 3-amino-GGPy-Sepharose 4B (1.5 × 20 cm) equilibrated with 10 mM Tris-HCl buffer (pH 8.0). The column was extensively washed with the same buffer and then with 10 ml of the buffer containing 100 μM GGPy. The fractions (10 ml) finally eluted with the buffer alone, and the following fraction eluted with the buffer containing GGPy were concentrated to 35 μl in Amicon Ultra Centrifugal Filters ULTRA CELL-10 K by centrifugation at 7,000 rpm. Protein contents in these fractions were measured by the Bradford method using bovine serum albumin as a standard. These concentrated samples were subjected to SDS-PAGE using a 15% (w/v) polyacrylamide gel and an ATTO Mini-Slab Electrophoresis System (Tokyo, Japan) at a constant current of 10 mA. The gels were stained with 0.25% (w/v) coomassie brilliant blue for 30 min and de-stained with a mixture of 5% (v/v) acetic acid and 5% (v/v) methanol in DW.

d) Identification of GGPy-binding proteins

GGPy-binding proteins were identified by matrix-assisted laser desorption ionization time-of-flight mass spectroscopy (MALDI-TOF-MS) (Iida et al., 2017). The major protein bands were excised from the gel and digested with trypsin. Mass spectra were collected by MALDI-TOF-MS using a Brucker Daltonics auto flex speed TOF/TOF system (Billerica, MA, USA) for protein identification. Peptide mass fingerprinting was carried out using the MASCOT program for protein identification (www.matrixscience.com/).

e) Assays of enzyme activities

The activity of GAPDH was determined using the reaction mixture containing 1.0 mM NAD^+, 10 mM EDTA, 0.1 mM dithiothreitol, 4.0 mM glyceraldehyde-3-phosphate, and the enzyme in 100 mM potassium phosphate buffer (pH 7.4) without or with 100 μM GGPy (McAlister and Holland, 1985). After the addition of the purified preparation of GAPDH from baker's yeast (Sigma-Aldrich), the increase in the absorption was monitored at the wavelength of 340 nm in a spectrophotometer at 37°C as the corresponding production of NADH. Glyceraldehyde 3-phosphate dehydrogenase activity is defined as the enzyme amount that can produce 1 μmol of NADH per min under the above conditions.

The activity of FAS was determined by NADPH oxidation coupled with both 3-ketoacyl reductase and enoyl reductase activities involved in each cycle of acetyl unit elongation by FAS (Hori et al., 1987). The reaction mixture consists of 200 μM NADPH, 50 μM acetyl-CoA, 50 μM malonyl-CoA, and the enzyme in 100 mM potassium phosphate buffer (pH 7.0) without or with 100 μM GGPy. FAS was partially purified from 100 μl of the cell-free extract, which was used for the detection of GGPy-binding proteins, with the aid of the ultrafiltration device VIVA SPIN 1000 k (Zartrius Co.) depending on its extremely enormous molecular weight (2,600 k). The time-dependent decrease in the absorption at 340 nm due to oxidation of NADH to NAD^+ was monitored in a spectrophotometer at 37°C. The enzyme activity is defined as the enzyme amount that can oxidize 1 μmol of NADPH to $NADP^+$ per min under the above conditions. The specific activity of the partially purified preparation was 1.09 units per mg protein.

f) Chemicals

Farnesol (FOH) and geranylgeraniol (GGOH) were products of Sigma & Aldrich (St. Louis, MO, USA). Glyceraldehyde-3-phosphate, NAD, NADPH, acetyl-CoA, malonyl-CoA, and cerulenin were also purchased from Sigma & Aldrich. Polyoxyethylene sorbitan monolaurate (Tween 40) was the product of Wako (Osaka, Japan). Other chemicals are of analytical reagent grade.

III. Results

a) Effects of GGPy on the cell viability of S. cerevisiae under various osmotic conditions

We first examined the lethal effects of GGPy in DW, YPD medium, and YPD medium with D-sorbitol added as an osmotic stabilizer to estimate its relation to the loss of cell wall integrity. As shown in Fig. 2A, GGPy lethality was markedly enhanced when cells were incubated in DW, suggesting the possibility of its dependence on inhibition of the yeast cell wall biosynthetic reaction. In contrast to our expectation, however, GGPy lethality was similarly enhanced under the hyperosmotic conditions with D-sorbitol, which was thought to protect GGPy-treated cells against the plasma membrane disruptive damage. These findings supported the idea of attributing GGPy lethality to its interference with a mechanism of cellular adaptation to

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the osmotic imbalance. It was therefore required to confirm the loss of cell viability directly in the GGPy-containing medium. Methylene blue staining was thus employed for the real-time evaluation of cell viability, giving rise to the results comparable to those obtained by the CFU-dependent analysis (Fig. 2B). This method indicated that GGPy lethality is enhanced in response to the osmotic imbalance or the environmental osmotic stress.

Figure 2C shows the structure-activity relationship in the osmotic stress-dependent fungicidal activity, indicating the loss of the corresponding lethality in the molecular structure of FPy with a shorter isoprenyl chain. GGOH is a naturally-occurring source of geranylgeranyl chain, being ineffective in causing the osmotic stress-dependent lethality. $GGNH_2$ was able to enhance the lethality only in YPD medium with D-sorbitol, but not in DW, suggesting the dependence of its fungicidal activity on a different type of toxicity. These results may indicate that both the geranylgeranyl chain and the structural modification of the terminal hydroxyl group are the minimum required for the generation of osmotic stress-dependent fungicidal activity.

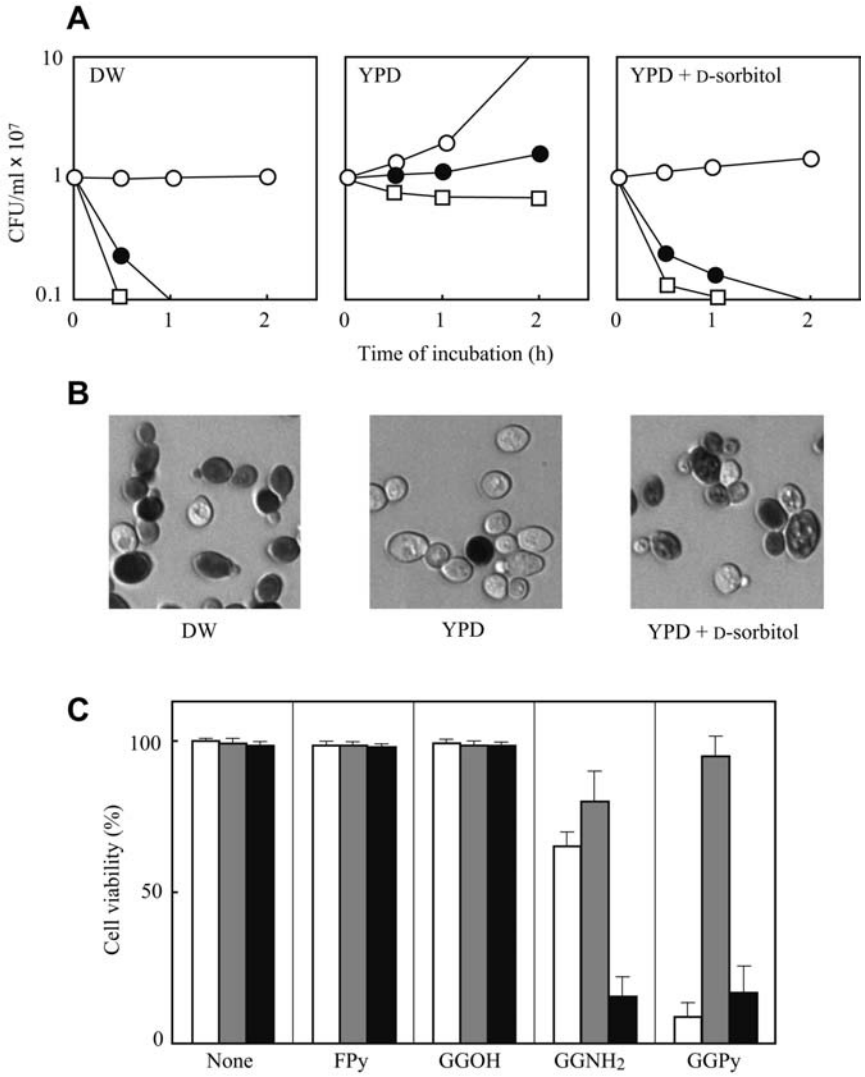

Fig. 2: Osmotic stress-dependent lethality of GGPy against *S. cerevisiae*. For (A), cells (10^7/ml) were incubated in DW, YPD medium, and YPD medium containing 1.2 M D-sorbitolat 30˚C with vigorous shaking. GGPy was added at 0 (○), 20 (●), and 40 μM (□). Viable cells were counted as colony-forming units. For (B), cells (10^7/ml) were incubated with 40 μM GGPy in DW, YPD medium, and YPD containing 1.2 M D-sorbitol at 30˚C for 1 h with vigorous shaking. Cells were observed under a phase-contrast microscope after staining with methylene blue for real-time evaluation of GGPy lethality. For (C), cells (10^7/ml) were incubated without or with 40 μM of each compound in DW (white bar), YPD medium (gray bar), and YPD medium containing 1.2 M D-sorbitol (black bar) at 30˚C for 1 h with vigorous shaking. Cells were then stained with methylene blue, and more than 100 cells were counted for evaluation of the cell viability under a phase-contrast microscope. Cell viability was expressed as the percentage of viable cells to total cells. Values are means ± S.D. of the cell viability measured in triplicate microscopic observations.

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b) Temperature-dependent lethality of GGPy

We next examined whether or not GGPy can enhance the loss of fungal cell viability under the condition with environmental stress other than the osmotic imbalance. As shown in Fig. 3, GGPy lethality was markedly enhanced even in the YPD medium alone by merely increasing the incubation temperature up to 37°C. As shown in Fig. 4, cells of *C. albicans* were more sensitive to GGPy than *S. cerevisiae* cells as judged from the partial loss of cell viability during incubation in YPD medium alone at 30°C. In spite of such an increased sensitivity to GGPy, GGPy lethality could be more increased when cells were placed under low and high osmotic environments. This human pathogenic fungal strain was also made sensitive to GGPy at the human body temperature of 37°C.

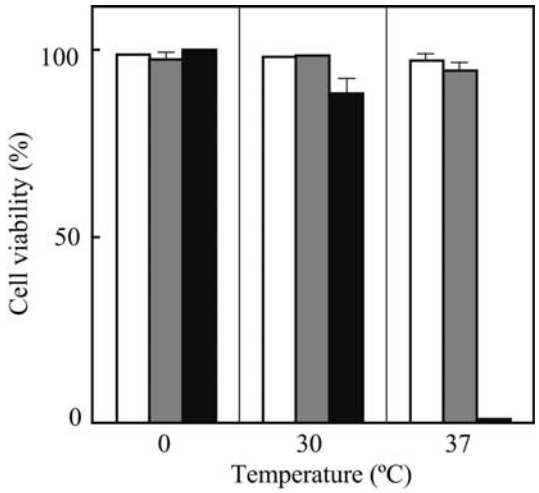

Fig. 3: Temperature-dependent lethality of GGPy against *S. cerevisiae*. Cells (10^7/ml) were incubated in YPD medium containing GGPy at the concentration of 0 (white bar), 20 (gray bar), and 40 μM (black bar) at the temperatures indicated with vigorous shaking for 1 h. Cell viability was determined and expressed as described in Fig. 2 (C).

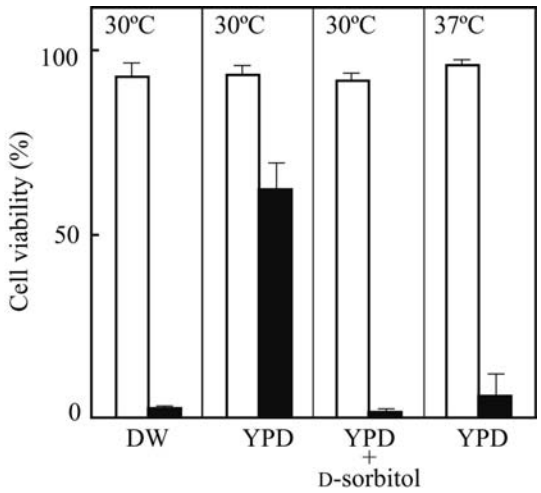

Fig. 4: Stress-dependent lethality of GGPy against *C. albicans*. Cells (10^7/ml) were incubated without (white bar) or with 40 μM GGPy (black bar) with vigorous shaking at the indicated stress conditions for 1 h. Cell viability was determined and expressed as described in Fig. 2 (C).

c) Identification of GGPy-binding proteins

It is highly probable that GGPy causes a stress-dependent lethality using the molecular interaction with a protein functional for fungal stress adaptation. We, therefore, attempted to purify and identify GGPy-binding protein as a possible molecular target of GGPy. As shown in Fig. 5, only two proteins bands were detected upon SDS-PAGE for the protein sample purified by the affinity chromatography using GGPy as a molecular ligand. No protein band was found when the affinity chromatography was done using the Sepharose 4B column alone prepared without GGPy, indicating that these two proteins should have predominant binding affinities with GGPy. As summarized in Figs. 6A and B, the mass spectral data revealed that the proteins 1 and 2 are a mixture of α- and β-subunits of FAS and GAPDH isozyme 3, respectively (Fig. 6C).

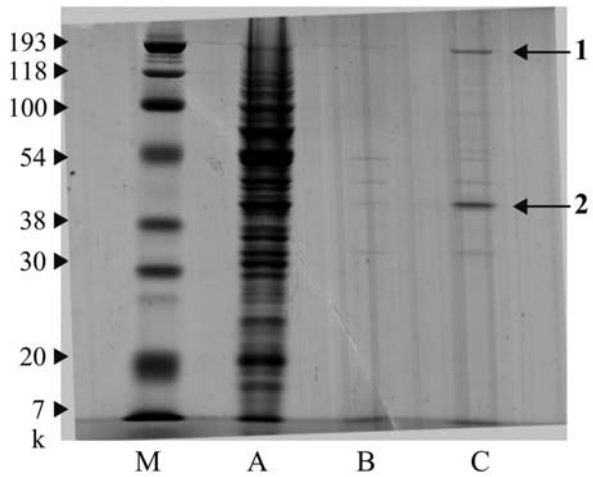

Fig. 5: SDS-PAGE of GGPy-binding proteins. After applying the protein sample from cells of *S. cerevisiae* W303-1A, the column was extensively washed with 10 mM Tris-HCl buffer (pH 8.0), and then washed with 10 ml of the buffer containing 100 μM GGPy. The fractions (10 ml) finally eluted with the buffer alone (B) and the following fraction eluted with the buffer containing GGPy (C) were concentrated and analyzed by SDS-PAGE. An aliquot of the cell-free extract (A) and SDS-standard markers were also included (M).

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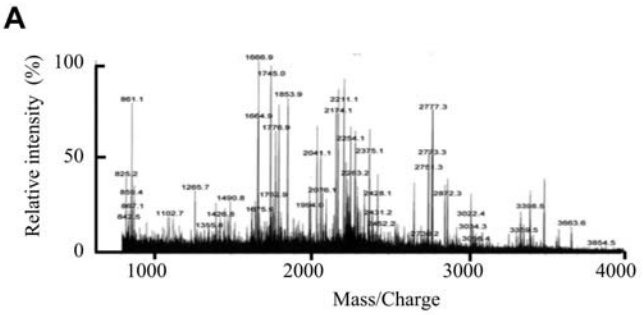

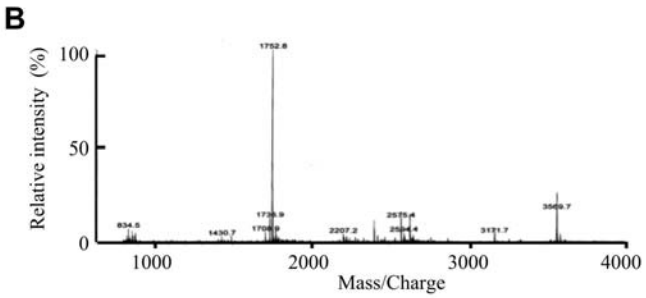

C

Band	Identified Protein		MOUSE score	Function	MOUSE score	Sequence coverage (%)
1	fatty acid synthetase	α-subunit	82	fatty acid synthesis	14/38	12
		β-subunit	71	fatty acid synthesis	13/38	11
2	glyceraldehyde-3-phospate dehydrogenase isozyme 3		98	glycolysis	8/37	52

Fig. 6: Peptide mass fingerprinting of the protein band 1 (A) and the protein band 2 (B) in MALDI-TOF-MAS, and the summary of identified GGPy-binding proteins (C).

d) Effects of GGPy on the activities of GAPDH and FAS

GAPDH isozyme 3 (Tdh3p) is involved in the oxidation of D-glyceraldehyde-3-phosphate to 1, 3-bisphosphoglycerate in the yeast glycolytic pathway, in cooperation with the other two isozymes Tdh1p and Tdh2p (McAlister and Holland, 1985). As expected from the existence of these isozymes, cells of Δ*tdh3* are viable, being characterized by the same MIC value of GGPy (6.25 μM) at 37°C as those found with Δ*tdh1*, Δ*tdh2*, and even with the parent strain. Indeed, GGPy was not inhibitory to the activity of GAPDH, as shown in Fig. 7A. These results should support the idea of excluding GAPDH from the molecular target in the stress-dependent fungicidal activity of GGPy.

FAS catalyzes the synthesis of palmitoyl-CoA, which is a donor of palmitic acid as a constituent of stress-tolerant cellular glycerophospholipids (Tehlivets et al., 2007). However, GGPy was not inhibitory to the enzymatic oxidation of NADPH, which is coupled with the incorporation of the acetyl unit into the growing chain of acyl moiety by FAS (Fig. 7B). This means that FAS can also be excluded from the molecular target of GGPy on the assumption that the repeated incorporation of acetyl unit results in its ultimate elongation to yield palmitoyl-CoA.

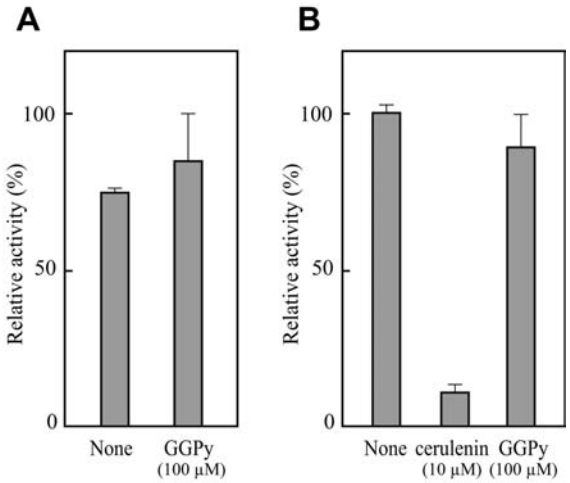

Fig. 7: Effects of GGPy on GAPDH (A) and FAS (B) activities. For (A), the time-dependent increase in the absorption at 340 nm was monitored at 37°C as the corresponding NADH production due to the enzymatic oxidation of D-glyceraldehyde-3-phosphate. For (B), the time-dependent decrease in the absorption at 340 nm was monitored at 37°C as the corresponding NADPH oxidation coupled with both 3-ketoacyl reductase and enoyl reductase activities involved in each cycle of acetyl unit elongation by FAS.

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e) Protective effects of palmitic acid on GGPy-induced growth inhibition

We finally confirmed whether or not the exogenous supplementation of palmitic acid can protect the yeast cells against GGPy lethality by using Tween 40 as the water-soluble and esterase-sensitive source of palmitic acid (Ohba et al., 1979; Waleng and Lands, 1975). As shown in Table 1, cerulenin-mediated growth inhibition could be fully protected in medium with Tween 40, as judged from the highly increased MIC values, agreeing with its selective inhibitory effect on 3-oxoacyl-ACP synthase activity of FAS (Funabashi et al., 1989). Such an inhibitory effect of cerulenin was not affected by the reaction temperature, as seen from the mostly identical MIC values (100 μM) found at 30 and 37°C. The MIC value of GGPy could be similarly increased with the addition of Tween 40 at 30°C, though its MIC value was kept at the lower level at 37°C, agreeing with the temperature-dependent increase in the toxicity of GGPy. These findings supported the idea that GGPy is permissive for the reaction of acetyl unit incorporation into the growing chain of fatty acid by FAS as judged by the successful oxidation of NADPH. Thus, the palmitic acid-dependent growth recovery of GGPy-treated cells likely indicates the failure in the enzymatic elongation of the acyl chain to yield palmitoyl-CoA as a donor of the long-chain saturated fatty acid for the synthesis of stress-tolerant glycerophospholipids (Klose et al., 2012; Leach and Cowen, 2014).

Table 1: Protective effects of palmitic and on the growth inhibitory activities of cerulenin and GGPy. The cell suspensions of *S. cerevisiae* W303-1A were incubated in 100 μl of YPD medium with varying concentrations of GGPy or cerulenin at 30 and 37°C, respectively for 24 h.

Addition	MIC (μM)*			
	Cerulenin		GGPy	
	30°C	37°C	30°C	37°C
None	3.13	3.13	12.5	6.25
Palmitic acid** (Tween 40)	>100	100	100	25

*Minimum growth inhibitory concentration.

**Palmitic acid was provided as its water-soluble derivative (Tween 40) at the final concentration of 0.1% (w/v).

IV. Discussion

Fungal cells can survive under the conditions with various stresses like thermal stress, ionic stress, oxidative stress, and osmotic stress by provoking the corresponding response for stress adaptation (Brown et al., 2014; Hallsworth, 2018). Among these cellular responses, the Hog1 (high-osmolarity glycerol response) mitogen-activated protein kinase pathway is known for a pivotal role in the adaptation of *S. cerevisiae* to the stress from high external osmolarity. In *C. albicans*, the Hog1 pathway is also involved in the cellular resistance to cell wall stress caused by β-1, 3-glucan synthase inhibitor caspofungin (Brown et al., 2014). However, Hog1 cannot be considered a primary target for the osmotic stress-dependent fungicidal activity of GGPy since the cell survival under low and high osmolarity conditions should require a more complicated responsive mechanism (Saxena and Sitaraman, 2016).

The osmotic stress-dependent fungicidal activity was generated only in the hybrid structure consisting of the geranylgeranyl chain and the nitrogen-containing attached group but not detected with GGOH itself (Figs. 1 and 2). Unlike GGPy, however, the lethality of $GGNH_2$ cannot be simply elucidated by the stress-dependent fungicidal activity, since $GGNH_2$-induced cell death could be highly enhanced in medium with D-sorbitol, but not in DW. Our previous study demonstrated that $GGNH_2$ could exhibit an antifungal activity depending on its molecular structure with a terminal amino group, which can serve as a substrate for fungal mitochondrial amine oxidase, producing H_2O_2 as a toxic by-product (Tanaka et al., 2004). Thus, D-sorbitol-dependent toxicity of $GGNH_2$ may be elucidated by the enhancement of its incorporation across the fungal plasma membrane under high osmolarity conditions, resulting in the acceleration of its oxidation by the mitochondrial amine oxidase (see Fig. 2). GGPy is only one with a clinical interest if its stress-dependent lethality can be applied against the pathogenic fungi like *C. albicans* at the human body temperature of 37°C (Figs. 3 and 4).

It is noteworthy that only two protein bands were detected on SDS-PAGE of GGPy-binding proteins, which are identified to be GAPDH isozyme 3 and each of α- and β-subunits of FAS, respectively (Figs. 5 and 6). This result supported the existence of a selective molecular interaction between GGPy and GAPDH, though such an intensive binding ability of GGPy could not be a cause of inhibition of the enzymatic activity. Another GGPy-binding protein FAS catalyzes the long-chain fatty acyl-CoA synthetic reaction as a form of α_6 β_6 heteromultimeric complex, being responsible for the ultimate synthesis of palmitoyl-CoA as a donor of the long-chain saturated fatty acid. Under various stress conditions, the length of the fatty acyl chain must be fully elongated to yield palmitic acid, which is evaluated as a constituent of stress-tolerant glycerophospholipids (Tehlivets et al., 2007). Cerulenin is a typical inhibitor of 3-oxoacyl-ACP synthase activity involved in the overall palmitoyl-CoA synthetic reaction catalyzed by the fungal FAS complex (Funabashi et al., 1989).Indeed, cerulenin-mediated inhibition of fatty acyl-CoA synthesis results in cell death in fungi regardless of the environmental stress condition (Nguyen and Nosanchuk, 2011). Unlike the case with cerulenin, however, GGPy has none of the structural relatednesses to acetyl-ACP or malonyl-ACP

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added as the substrates for fatty acyl chain elongation by FAS, agreeing with its inability of inhibiting the apparent activity of FAS.

In the cellular membrane of *S. cerevisiae*, the degree of phospholipid saturation is lowest at 15°C and highest at 37°C with the length of fatty acyl chain becoming longer with increasing environmental temperature (Klose et al., 2012; Leach and Cowen, 2014). This means that palmitic acid synthesis is essential for the yeast cell survival under the thermal stress condition at 37°C, agreeing with our finding that the exogenous supplementation of this long-chain fatty acid can protect the yeast cells against the toxicity of GGPy. Thus, it may be postulated that GGPy is permissive for the fatty acyl chain elongation by FAS to yield short- or medium-chain fatty acid, as represented by the successful oxidation of NADPH. Even in the case, GGPy may be inhibitory to the ultimate elongation of fatty acyl chain to yield palmitic acid. It is also possible to elucidate the growth inhibitory effect of GGPy at 30°C by the accumulation of short- or medium-chain fatty acids in GGPy-treated cells, as is the case with the growth inhibition by the production of octanoic and decanoic acids during the process of yeast alcohol fermentation (Viegas et al., 1989). Further investigation is needed to solve how GGPy can interact with FAS for modification of the enzymatic fatty acyl chain elongation.

Acknowledgements

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Exploring the Relationship between Advertisement of Alcohol on Consumption and the Perceived Health Implications among Youth in the Ashaiman Municipality, Ghana

By Stephen Manortey & Seyram Kugbega

Abstract- *Introduction:* Alcohol consumption is a key obstacle to sustainable human development. It is noted worldwide that alcohol consumption and use contribute to 3.3 million deaths every year. The United Nations classified individuals between the ages of 15 to 25 years as youths. The use of alcohol at this critical stage of life can lead to serious health outcomes, such as causing harm to vital body organs like the liver. Negative social and behavioral consequences such as unsafe sexual behavior are also consequences associated with alcohol use, and this has become a major public health issue globally. Various advertisements both in print and electronic media are contributing factors that encourage alcohol use among the youth. This study, therefore, aimed at determining the prevalence of alcohol use and also to identify the influence of exposure to advertisements of alcoholic beverages on consumption, perceptions, and knowledge on its health implications.

Methodology: A quantitative cross-sectional descriptive study design was used in this study. A total of 297 youths were sampled in four (4) suburbs within the Ashaiman Municipality in the Greater Accra Region of Ghana to participate in the study using a well-structured questionnaire.

Keywords: *alcohol consumption, youth, Ashiaman municipality, Ghana.*

GJMR-K Classification: *NLMC Code: QV 82, WA 590*

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Exploring the Relationship between Advertisement of Alcohol on Consumption and the Perceived Health Implications among Youth in the Ashaiman Municipality, Ghana

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Results: Alcohol use prevalence was 85.19%, with the revealed types of alcoholic beverage preferred by the respondents noted as spirits and beer. Advertisement and peer pressure are the principal influencing factor for alcohol use after controlling for all other covariates in the model. Alcohol consumption was significantly high among the ages 20-25 with a decrease as the age increases. Individuals who could afford to buy drinks for themselves were about five (5) times more likely to go for an alcoholic beverage compared to those who had either a brother or sister doing the purchase adjusting for other covariates.

Conclusion: Advertisements for alcohol via mass media in Ghana tend to have a statistically significant association with regards to the usage among the resident youth in the Ashaiman Municipality. Measures should be set in place by the oversight authorities to curb this public health threat.

Keywords: alcohol consumption, youth, Ashiaman municipality, Ghana.

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I. Introduction

Despite the negative health effect of alcohol, its use is legal and acceptable socially in most countries in the world and considered the most used drug worldwide. It is consumed mainly by individuals for relaxation, fun, and social reasons. Jernigan (2001), established the global burden of disease from alcohol to exceed that of tobacco in large part because acute consequences of alcohol use led to death and disability in the younger years of life[1].

Alcohol is a drug and also classified as a depressant[2]. It hinders vital functions controlled by the central nervous system, resulting in distortions in speech, unsteady movement, and impairing an individual's judgment and ability to think accurately. It has effects on every organ of the human body and depresses the central nervous system[3]. The metabolism of alcohol takes place in the liver, and this is accomplished by the liver enzymes. The liver metabolizes alcohol and the remaining leftover circulates throughout the human body. The real intensity of alcohol on the body is proportional to the amount/quantity intake. Hence, individual reactions to alcohol are varied, and this can be due to many reasons and factors such as age, gender, the physical condition (weight, fitness level, etc.) and the amount of food the person consumed before taking a drink. Other influencing factors include drugs or prescription of medications and family history on the alcohol problems [4].

Alcohol use and consumption in most societies are considered a luxury and so the wealthier countries consume more alcohol than the rest of the world. The use and abuse of alcohol are widespread among students. According to the National Survey on Drug Use and Health (NSDUH) in 2013, approximately 24.6 million Americans aged 12 or older current illicit drug use [5].

The amount of pure ethanol in a standard drink is an important measure to regulate what goes into production for global consumption that will not affect the health status of the country. From one country to

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another, the amount of pure ethanol in a standard drink varies. Interestingly, this concept of standard drinks is not common in Ghana. People who produce such alcoholic beverages use frivolous measures, which include the use of containers such as bottles, gourds, or calabashes, to indicate or count the volumes of alcohol they consume [6]. Locally produced alcoholic beverages in Ghana are often sold in a measure referred to as a "*tot*". Thus, people use the number of tots consumed to quantify the amount of alcohol they have drank.

However, the widespread abuse of alcohol has been recognized as an important public health problem among young people in many societies. According to the Centre on Alcohol Marketing and Youth (CAMY) 2010, alcohol drinking among the youth in the United States is growing rapidly where about 10.4 million young people aged between twelve to twenty-one years are reported to consume alcohol, and 6.9 million binge drink in 2009[7]. Similar trends were recognized in South Africa, which has been regarded as one of the highest alcohol consumption countries at the global stage, as stated by the World Health Organisation (WHO) report in 2011[8].

Alcohol advertisement is regarded as one of the influences that contribute to consumption and individual perception of alcohol. It is also widely criticized for creating a climate in which consumption is regarded as a norm[9]. Anderson *et al.*, (2017) stated that *"For young people who have not started to drink, expectancies are influenced by normative assumptions about teenage drinking as well as through the observations of drinking by parents, peers, and models in the mass media"[10].*

Despite the criticism, the truth remains that many people rely heavily on both print and electronic media advertisements as a primary source of information and entertainment. In the contemporary landscape, the youth are exposed to alcohol advertisements at an extraordinary level from various sources, where massive exposures to advertisements are unavoidable. Apart from the traditional modes of advertising such as television, radio, and print media, the evolution and introduction of new digital technologies such as smartphones, the internet have opened new avenues for alcohol advertising. The alcohol industry is aggressively harnessing the potential of online advertising. The use of billboards and posters is another platform of advertisement that the alcohol industry harnesses, and this has flooded the streets of the country with peculiar characteristics that accompany it called the "blue kiosk".

Alcohol consumption has become a symbol of adulthood, acceptability, and identity among youth groups, especially for those who love to have fun. Advertisers and marketers of alcoholic beverages take advantage of this by depicting alcohol as the start of wild adventures and fun. Research has shown that the presence of older youths with drinking habits within the home and communities is copied by those less than 18 years of age, and this normalizes alcohol use [11]. Drinking has become a norm at social events such as sports, celebrations, and music events simply because everybody drinks has its acceptability by society. In most African countries, alcohol is indigenous to cultural believes and practices. During festive occasions, alcohol plays a key component, mostly among the youth. Marriage, naming ceremonies, festivals, and parties are not complete with the absence of alcohol. Thus, most youth on some occasions, bring along their drinks for consumption.

The Government of Ghana took measures to combat the scourge of alcohol use and abuse among the youth, which in the long-term impact on the health of the country by the enactment of *Ghana Alcohol Policy* (2016) [12]. However, the advertisement on many media platforms is still a major menace and contributing greatly to the patronage of alcoholic beverages across the country. A case study by Amoateng (2013) in Ghana proved that the use of radio and television is a powerful tool in marketing to reach consumers of alcoholic beverages. Consumer preferences to a large extent, are affected by advertisements, especially among those who associate a celebrity with a brand as well as having actual knowledge about product performance or functions, labelling, and product ingredients [13].

The study, therefore, aimed at exploring the relationship between alcohol advertisements and consumption. Also, to determine the perception for consumption and knowledge on the health implications.

II. Methodology

a) Profile of Study Area

The Ashaiman Municipality is one of the sixteen (16) administrative districts and municipalities in the Greater Accra Region of Ghana. Its capital is Ashiaman. The municipal covers a total land area of about forty-five (45) square kilometers. It can be located about four kilometers north of Tema, the industrial city of Ghana and, about 30 kilometers from Accra, the administrative capital. Ashaiman is a sprawling urban settlement with most of its suburbs exhibiting characteristics of a slum. The total population of Ashaiman, according to the 2010 National Population and Housing Census, was about 190,972, with an annual growth rate of 2.1%. It consists of about 49.1 % males and 50.9% females. About 30% of the population comprising the youth between the ages of 15 to 30 years[14].

Ashaiman is a multi-ethnic society with about fifty (50) tribes and twenty (20) documented tribal heads. There are four dominant ethnic groups being Ga-Adangme, Akans, Dagombas, and Ewes. With religious affiliation, Christians with few Muslims and traditionalists dominate the municipality. The study was

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conducted at Jericho, Asensu Ba, Lebanon, and Night Market, which are all suburbs in the Ashaiman Municipality. Individuals who were not permanent residents in any of the four listed suburbs, and were outside the chosen age brackets were excluded from participating in the study.

b) Study Design and Sample Size

A cross-sectional study design with a quantitative approach was employed to gather data among the youth in four suburbs. Both closed and open-ended questions were used for data collection in this study. Participants were located by a convenience sampling method in the various drinking pubs, youth groups and associations, and lorry parks in the communities. Pretesting of questionnaires was done in Official Town, another suburb of the Ashaiman Municipality with similar environmental characteristics as the study site.

The projected sample size for the study was 289 respondents. This was calculated using the Cochran Sample Size calculation formula[15], with a known alcohol consumption prevalence of 25.1% (Country Profile, 2004) on a 95% Confidence Interval with a margin of error of 5%.

$$n = \frac{Z^2 p(1-p)}{e^2} = \frac{1.96^2 \times 0.251 \times (1-0.251)^2}{0.05^2} = 289$$

Where,
n = the required sample size,
p = prevalence of alcohol consumption (25.1 %) [16],
Z = score at 95% confidence level
e = margin of error

A 10% non-respondent rate adjustment brought the total estimated sample size to about 320.

c) Data Collection and Statistical Analysis

The study employed a quantitative approach to data collection in January-February 2019. The measurement tool used for the study was a self-administered questionnaire made available in the English language. Where needed, the questions were translated into the local languages that the participants best understand. The questions were related to socio-demographic characteristics, socioeconomic characterristics, alcohol use, and means of getting alcohol, knowledge on the effects of alcohol use, and so on.

The data were imported into STATA statistical software package (*StataCorp.2007. Stata Statistical Software. Release 14*. StataCorp LP, College Station, TX, USA) for analysis. A comprehensive univariate, bivariate and multivariate analyses were respectively conducted to describe the pattern of distributions, assess the levels of statistical associations and predict the effects of selected indicators on the outcome variable (alcohol use).All statistical tests were done at a confidence interval of 95%.

d) Ethical Consideration

Ethical approval was obtained from Ensign College of Public Health's Ethics Review Board, and administrative permissions were further sought from the due authorities. Informed consent of study participants was sought before administering the questions, making them aware of their rights to withdraw from the study. Participants below 18 years were given a parental assent form to access permission to proceed to participate. Participants were informed of the confidentiality of the study and the ability to withdraw when necessary. To elicit accurate information for the study, participants were not rewarded for participation but were given extensive information on some health issues related to alcohol consumption.

III. Results

a) Socio-demographic characteristics

A total of 320 questionnaires were administered and two hundred and ninety-seven (297) were appropriately completed and submitted, yielding a study response rate of 92.81%. Out of the 297 total respondents, 193 were males representing 64.98% of the sample, and one hundred and four were females representing 35.02%. The majority of respondents were between the ages of 26-30 years (39.06%), followed by 20-25 years (50.84%) and lastly 16-19 years, accounting for 10.10%. The study participants were mostly single made up of one hundred and ninety-two respondents (60.94%), forty-one (13.47%) co-habiting, and the rest married. 32.66% of respondents had their educational level up to Junior Secondary School, with forty respondents making 12.12 percent with no formal education (Table 1).

Table 1: Socio-demographic characteristics of respondents (youth)

Variable (N= 297)	Categories	Frequency (n)	Percentage (%)
Gender	Female	104	64.98
	Male	193	35.02
Age	16-19	30	10.10
	20-25	151	50.84
	26-30	116	39.06
Level of Education	None	36	12.12
	JSS	97	32.66

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	SSS	89	29.97
	Tertiary	75	25.25
Religion	Christian	233	78.45
	Muslim	51	17.17
	Traditionalist	13	4.38
Ethnicity	Ewe	106	35.69
	Ga-Adangme	67	22.56
	Akan	96	32.32
	Others	28	9.43
Marital Status	Single	181	60.94
	Married	76	25.59
	Co-habiting	40	13.47
Occupation	Unemployed	8	2.69
	Student	89	29.97
	Civil servant	34	11.45
	Artisans	86	28.96
	Traders	45	15.15
	Drivers	18	6.06
	Others	17	5.72

Out of the total respondents, two hundred and sixty-nine (90.08%) have ever consumed alcohol, and out of this were two hundred and fifty-four (84.71%) who admit to currently consuming alcoholic beverages. The mean age of onset of consumption of alcohol was 19.76 years with a minimum of six (6) years and a maximum at 28 years. Males 185 (68.77%) consumed more alcohol than females 84 (31.23%). The number of respondents aged 26-30 years 106 (39.41%) consumed more alcohol than the other age groups, and those who were single also had a high consumption of alcohol 152 (59.94%).

b) Prevalence of alcohol use

The study showed that more than three third of the total respondents (269), attested that they had consumed alcohol. Assessment of their current intake revealed that the majority of the participants who had taken alcohol, still do, with only 5.58% of those who reported ever taken alcohol, admitting they no longer do the same (Table 2).

Table 2: Prevalence of current alcohol

Alcohol use (Ever)	Frequency (n)	Percentage %
Yes	269	90.57
No	28	9.43
Total	297	100
Current alcohol use		
Yes	253	85.19
No	44	14.81
Total	297	100

The kinds of alcoholic beverages that were reportedly taken by respondents include beer, spirits, and wine. About a third of the total respondents (33.0%) consume spirits which comprise of various "*bitters*" (alcohol-based drink) and "*akpeteshie*" (locally brewed alcoholic drink), followed by beer (25.59%) and 21.21% of the respondents acknowledging they consumed all alcoholic beverages that include wine, spirits, and beer. On average, respondents spent about $3.00 on alcohol per week. Sources of alcohol for use by the respondents were mainly from a purchase by oneself, representing 44.78%. Out of two hundred and fifty-three respondents who are current users of alcohol, thirty-nine of them smoke either cigarettes or wee. On the question of smoking, 42 of total the respondents accounting to about 14.14% were reported being current smokers (Table 3).

Table 3: Preferred type of alcohol

Variable	Frequency (n)	Percentage %
Beer	76	25.59
Wine	24	8.08
Spirits	98	33.00
All	63	21.21
None	36	12.12

c) Probable Factors that influence alcohol use

The majority of respondents 269 (90.57%), revealed they had access to at least a source of media. Out of two hundred and sixty-nine respondents who disclosed having access to mass media, 126 (46.84%) watched television only, and 46 (15.61) disclosed using the mobile phone as a means of getting information. A total of 38 representing 14.13% of the study sample used television and mobile phone as a means of getting information. To assess if the advertisement was an influence on alcohol consumption, 222 (74.75%) of participants disclosed that advertisement on alcohol encourages their drinking behavior. As to what in the advertised brand that influenced them, 82 (36.94%) stated the musicals, and 77 (34.68%) stated the use of celebrities as a contributing factor to alcohol use. The majority 44 (18.82%), attest to the use of role models and animation to have some amount of effect on their choices. However, 13(5.86%) asserted that nothing in the advert influenced them but makes them aware of the latest brand available.

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Further probing revealed below that peer pressure, advertisement, and accessibility/ availability of alcohol were acknowledged by more than a fifth of the respondents as probable contributors to alcohol use among the youth (Table 4).

Table 4: Influences to drink

Influences to drink (N=297)	Frequency (n)	Percentage (%)
Peer pressure	78	26.26
Advertisement	67	22.56
Social media	7	2.36
Parental/Sibling influence	15	5.05
Availability/ Accessibility to alcohol	64	21.55
None	50	16.84
Others (problems at home and death)	16	5.39

d) *Perception and knowledge of the health implications of alcohol use*

Per the findings, 21.21% believed alcohol use relaxes them and make them have fun, 18.52% also percieved it makes them sexually active. The majority of participants 262 (88.22%) answered knowing of some health problems related to alcohol consumption. Further probe displayed a pattern of almost an even distribution of respondents stating that the listed diseases were associated with alcohol use and also likely associated with sexually transmitted diseases. About six out of every ten respondents (62.63%), stated alcohol was not associated with sexually transmitted diseases (Table 5).

Table 5: Perceptions about alcohol use that influences to drink and knowledge of health implications

Variable	Frequency	Percentage (%)
Perception of alcohol functions		
Makes sexually active	55	18.52
Feel strong and empowered	48	16.16
Makes me smart	47	15.82
Forget personal issues	47	15.82
For relaxation and fun	63	21.21
None	37	12.46
Knowledge on health implications		
Yes	262	88.22
No	35	11.78
Total	297	100

e) *Test of Associations of Explanatory Variables*

The bivariate analysis indicates there exists a statistically significant association between gender, level of education, and the tendency to take alcohol with observed p-values of <0 .001 in each case respectively among those who ever or currently used alcohol. However, there was no such level of a significant association between age, marital status, and tendency to use alcohol with observed p-values greater than 0.05 (Table 6 & 7).

Table 6: Bivariate analysis of demographic characteristics and alcohol consumption (Ever)

Characteristics N (297)	Ever Consumed alcohol		X^2	p-value
	Yes n (%)	No n (%)		
Sex				
Male	185 (68.77)	8 (28.57)	18.01	< 0.001*
Female	84(31.23)	20 (71.43)		
Age (Years)				
15-19	25(9.29)	5(17.86)	2.2292	0.328
20-25	139(51.67)	12(42.86)		
26-30	105(39.06)	11(39.29)		
Level of education				
None	36(13.38)	0(0.00)		
JSS	94(34.94)	3(10.71)	18.46	< 0.001*
SSS	79(29.37)	10(35.71)		
Tertiary	60(22.30)	15(53.57)		
Religion				
Christian	211(78.15)	22(81.48)	1.37	0.505

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Muslim	46(17.04)	5(18.52)		
Traditionalist	4(4.81)	0(0.00)		
Marital Status				
Single	163(60.59)	18(64.29)	0.25	0.889
Married	69(25.65)	7(25.00)		
Co- habiting	37(13.47)	3(10.71)		
Ethnicity				
Ewe	96(35.69)	10(35.71)		
Ga-Adangme	61(22.68)	6(21.43)	5.88	0.118
Akan	90(33.46)	6(21.43)		
Others	22(8.18)	6(21.43)		
Occupation				
Unemployed	8(2.97)	0(0.00)		
Student	71(26.39)	18(64.29)		
Civil servant	28(10.41)	6(21.43)		
Artisans	84(31.23)	2(7.14)	25.61	< 0.001*
Traders	44(16.36)	1(3.57)		
Drivers	18(6.69)	0(0.00)		
Others	16(5.72)	1(3.57)		

Table 7: Bivariate -Socio demographic characteristics on alcohol consumption (current)

Characteristics N (297)	Current alcohol Use		χ^2	p-value
	Yes	No		
Sex				
Male	174(68.77)	19 (43.18)	10.79	< 0.001*
Female	79(31.23)	25 (56.82)		
Age (Years)				
15-19	24(9.46)	6(13.64)	0.74	0.690
20-25	129(50.99)	22(50.00)		
26-30	100(39.53)	16(36.36)		
Level of education				
None	35(13.83)	1(2.27)		
JSS	90(35.57)	7(15.911)	15.65	< 0.001*
SSS	71(28.06)	18(40.91)		
Tertiary	57(22.53)	18(40.91)		
Religion				
Christianity	195(77.08)	38(86.36)	3.05	0.218
Muslim	45(17.79)	6(13.64)		
Traditionalist	13(5.14)	0(0.00)		
Marital Status				
Single	151 (59.68)	30(68.28)	2.15	0.342
Married	65 (25.69)	11(25.00)		
Co- habiting	37 (14.62)	3(6.82)		
Ethnicity				
Ewe	88(34.78)	18(40.91)		
Ga-Adangme	59(23.32)	8(18.18)	3.99	0.262
Akan	85(33.60)	11(25.00)		
Others	21(8.30)	7(15.91)		
Occupation				
Unemployed	8(3.16)	0(0.00)		
Student	62(24.51)	27(61.36)		
Civil servant	28(11.07)	6(13.64)		
Artisans	81(32.02)	5(11.36)	27.67	< 0.001*
Traders	41(16.21)	4(9.09)		
Drivers	17(6.72)	1(2.27)		
Others	16(6.32)	1(2.27)		

*Denotes statistical significance at a 95% CI

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f) Association between Advertisement and Alcohol Use

Table 8 indicates that there was a significant association between respondents' hearing of advertisements on both print and electronic media and the consumption of alcohol in Ashaiman. The observed p-value was <0.001, which is far less than the threshold of 0.05. Further probe into what component of the advert encourages respondents to drink 27.61% and 25.93% said the musicals and use of celebrities respectively encourage them to use alcohol.

Table 8: A Bivariate test of association between advertisement and alcohol use

Variable (Advertisement)	Alcohol use		P-value
	Yes	No	
Yes	206	16	< 0.001*
No	47	28	

*Denotes statistical significance at a 95% CI

g) Multivariate Logistic Regression model for relevant predictor variables

Results obtained showed a significant association between gender and alcohol consumption. Being female reduced the odds by 65.5% of alcohol consumption and thus was shown to be protective (0.345, 95% CI=0.18, 0.66).

Results obtained showed a significant association between gender and alcohol consumption in the unadjusted logistic model with females reduced the odds by 65.5% of alcohol consumption and thus was shown to be protective (0.345, 95% CI=0.18, 0.66).

An observation on alcohol use and educational level showed adjusted odds ratio for current alcohol use and advertisement depicted a statistically significant odds of 3.92 times more likely to consume alcohol as there are exposed to advertisements compared to counterparts who did not know of the advertisement of alcohol.

On the other hand, the study data from study participants who had no known source of alcohol were 0.95 times less likely to consume alcohol compared to those who get from their brothers and sisters holding all other variables constant when adjusted for other covariates in the model. For educational unadjusted for other covariates showed that those with a tertiary level of education were 0.01 times more likely to use alcohol compared to those with no formal education holding all other variables constant. Thus, the likelihood of usage of alcohol tends to decrease with an increased level of education attained.

Table 9: Logistic regression on alcohol consumption (current) and other significant variables

Variables	Unadjusted		Adjusted	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Gender				
Male *(Ref)*	1	-	1	-
Female	0.35(0.18, 0.66)	< 0.001*	0.70(0.23,2.07)	0.514
Level of Education				
None *(Ref)*	1	-	1	-
J.S.S	0.37(0.04,3.09)	0.357	0.57(0.05,6.26)	0.643
S.S.S	0.11(0.02,0.88)	0.037*	0.25(0.02,3.01)	0.277
Tertiary	0.09(0.01,0.71)	0.022*	0.80(0.05,11.87)	0.874
Influence of advertisement				
No *(Ref)*	1	-	1	-
Yes	7.67(3.84,15.30)	< 0.001*	3.92(1.29,11.94)	0.016*
Occupation				
Unemployed *(Ref)*	1	-	1	-
Student	1.14(-0.02,1.13)	0.066	0.26(0.01,8.17)	0.445
Civil servant	0.29(0.03,2.64)	0.273	0.43(0.01,16.84)	0.653
Artisans	1.01(0.11,9.26)	0.991	0.84(0.03,26.46)	0.922
Traders	0.64(0.07,6.17)	0.700	0.24(0.01,8.18)	0.431
Drivers	1.06(0.06,18.45)	0.967	1.15(0.02,66.98)	0.945
Others	1	-	-	-
Sources of alcohol				
Brothers and sisters *(Ref)*	1	-	1	-
From home without parents	2.80(0.26,30.17)	0.396	1.89(0.15,23.62)	0.620
From friends	2.04(0.44,9.54)	0.365	1.58(0.29,8.48)	0.595
Buy on my own	6.45(1.32,31.62)	0.022*	4.96(0.89,27.57)	0.067
From friend & buy on my own	7.40(0.71,76.92)	0.094	3.17(0.25,40.67)	0.376
None	0.05(0.71,76.92)	< 0.001*	0.05(0.01,0.26)	<0.001*

*Denotes statistical significance at a 95% CI

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IV. Discussion

The prevalence recorded in this study is similar to a study done in Accra by Oppong Asante *et al*. (2014), which reported 81.3% of their respondents admitting ever used alcoholic beverages[17]. It is, however, much higher than that of a national survey which indicated a 25.1% prevalence of alcohol consumption among the youth in Ghana [16]. The difference in these surveys can be attributed to the increase in the number of drinking bars and the easy access to the bars by the youth in communities in the Ashaiman Municipality, thereby increasing consumption.

The gender distribution in this study conforms to previous but similar studies conducted by Osei-Bonsu *et al.* (2017), whose study also reveals lesser female participation[18]. This was consistent with findings by Chauke *et al*., (2015) in a study conducted among high school students in South Africa even though there were just a few more females than males[19]. The high number of males who consume alcohol can be attributed to the acceptability of alcohol consumption by males as a social norm as compared to female alcohol consumption, which the very society frowns upon. Most of the respondents who consume alcohol were in their active and youthful ages (20-25). Consumption of alcohol, however, recorded a decrease in the ages 26-30 years, which is supported by the findings from Osei-Bonsu *et al.*, (2017) which also reported similar trend as age increases[18].

The study revealed no significant association between the ages of respondents and possible alcohol use (p-value =0.955). The results are, however, contradictory to a study carried out in the Volta Region of Ghana by Osei-Bonsu *et al.*, (2017), which recorded an association between alcohol use and consumption [18]. A relationship between the gender of the respondents and their tendency to use alcohol was established (p-value =0.001). A study by Adu-Mireku (2003), among Senior High School students in Accra, reported females to be less likely to use alcohol collaborate the findings of this study[16]. A significant association was also established between education level, occupation, and the tendency to use alcohol, respectively. There was no observed significant relationship between alcohol use on religion, marital status, and ethnicity of the respondents. This finding is in line with Michalak *et al*., (2007) assertion that religion is strongly associated with abstention from alcohol use[20].

Individuals with Junior Secondary School level of education had high usage of alcohol compared to those with Senior Secondary school and tertiary level of education. This finding also confirmeda similar study done by Osei-Bonsu *et al.*, (2017) in the Volta Region of Ghana [18]. This could be attributable to the curious nature of these younger folks with the inner quest to try everything they have been cautioned against. A study by Obot *et al*., (2005) found that peer influence was a major factor that influences alcohol use. Thus, it agrees with the findings of this study. This can be attributed to the youth acceptability of the lifestyle of other peers who may be involved in drinking, hence this is done to please their peers [21].

Gender, education, and occupation were found to be significantly associated with alcohol use either in the past or at the time of participation in the study. It was further observed that peers influence, advertisement and accessibility/availability of alcohol respectively are responsible for the use of alcohol by youth. Respondents offered various reasons why they consume alcohol but one that stood out was the availability of these drinks which accounts for about 21.55%, and this should be a major public health concern. This phenomenon can be associated with the everyday social events like funerals, weddings among others where the use of alcohol by the youth is regarded as the norm and part of the celebrations. The response also showed that some of the study participants also see the consumption of alcohol as a way to have fun and relax. Some use it as appetizers to enable them to eat well.These findings were consistent with studies conducted by Oshodi *et al.*, (2010) and Osei-Bonsu *et al.*, (2017) who also found similar reasons associated with substance use among secondary school students[22],[18].

The results of this study showed “spirits” as the most consumed alcoholic beverage by the youth in Ashaiman, followed by beer. An overwhelming proportion also consumes all three beverages, namely wine, beer, and spirits. In this study, most of the spirits consumed are what is referred to as the “bitters”. This observation, however, disagreed with the national consumption of alcohol according to the World Health Organisation (2014), which recorded the most consumed alcoholic beverage to be beer followed by wine, spirits and other alcoholic beverages[23]. This finding also disagrees with Odejide (2006), a survey in the Gambia among the youth, which found out that beer was mostly used by the youth, followed by wine and spirit. The trend observed can be attributed to the increased advertisement of locally manufacture alcoholic beverages which are called “bitters”. These alcoholic beverages are retailed at prices as low as five (5) cents making it more accessible to the youth[24]. The high rate of alcohol consumption among the youth is a pointer to the development of disturbing health problems in the future. Developing lung cancer is a major concern as epidemiological evidence has been established on alcohol and lung cancer [25].

Alcohol consumption is very often advertised as the quickest medium for relaxation and fun, a booster to one’s sexual drive, the best appetizer for the hungry mouth, and the solution to forgetting personal problems.

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Unfortunately, less is said about the side effects associated with this menace. With an overwhelming number of the study respondents upholding these perceptions, there is a strong likelihood that any excessive use will rather complicate their health conditions. The findings recorded that approximately 63% of respondents were not aware of the relation between alcohol use and STI's although various researches including Simbayi *et al.*, (2004) have confirmed this[26].

The findings of this study showed those exposed to advertisements of alcohol are 3.92 times more likely to use alcohol compared to their counterparts, holding all other variables constant. This corroborates the results of other similar studies done by Snyder *et al.* (2006); Koordeman, *et al*. (2012), and Amoateng (2013) which showed an association between exposure to the advertisement of alcohol and its use[27][28][13]. This trend can be said to be a result of the message portrayed in the adverts together with the use of celebrities, role models and the catchy nature of the music used. This is confirmed by the study of Chen *et al.* (2005) which identified that the humour and music associated with alcohol adverts contribute to alcohol consumption by youth [29].

V. Conclusion

The prevalence rate of alcohol is significantly high among the youth in the selected suburbs in the Ashaiman Municipality, with a decrease in consumption as one age and the level of education increases. Generally, both males and females were found to be consuming alcohol, however, males were more likely to do so compared to their counterparts. This is a public health challenge and needs to be addressed. Religion was not seen to play any contributing factor to the use of alcohol in this study. Accessibility to alcohol and peer pressure has led many of the youthinto alcohol use for social acceptability as this research confirms.

Advertisement of alcohol in various mass media is associated with alcohol use among the youth. Some youth consume alcohol for fun and entertainment to help forget their personal problems which are a major chronic problem in society. The many advertisements of alcoholic beverages on mass media are of great concern and need to be regulated as it is trapping the youth, the future and potential human capital for a developing country like Ghana into the vice of drinking.

VI. Limitations of the Study

Recall bias is a limitationto this study as some respondents had difficulty recollecting the first time they had a drink containing alcohol. Also, the limited size of the sample used will make it impossible to generalize the finding to a larger population. Future research work should consider adopting a qualitative approach together and tease out in-depth views from respondents on the subject matter.

Authors' contributions

This work was carried out in collaboration between all authors. SK and SM participated in conceiving the study and in the development of data collection tools. SK carried out data collection. SM and SK participated in the data analysis and drafting of the manuscript. All authors read and approved the final manuscript.

Conflict of Interest

All authors declare no conflict of interest.

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Clinical Signature among Victims of Intimate Partner Violence: A Study using Text Classification Tools

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Abstract- *Introduction:* Intimate partner violence is a major public health problem and a violation of women's human rights. It is important to explore the speech of the victim at the time of the complaint.

Objective: To analyze the text classification with word cloudas a tool to understand the pattern of patient functioning, complementing the qualitative analysis.

Method: It is a text classification study with a word cloud analysis technique, complementing the qualitative analysis. The sample is fifty-six women victims of self-reported domestic violence, who came from a public service in South of Brazil.

Results: A word cloud was developed from the speech of the 56 participants.

Discussion: The women's discourse in the interviews had focused on understanding what had really happened in their relationship, reporting their abusive situations. Studies using this technique benefit from including heterogeneous patients considering their idiosyncrasies to develop a complex non-linear pattern relating predictors to the clinical outcome.

Keywords: *intimate partner violence, word cloud, qualitative research.*

GJMR-K Classification: *NLMC Code: W 795*

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Clinical Signature among Victims of Intimate Partner Violence: A Study using Text Classification Tools

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Conclusion: It was possible to understand the pattern of patient functioning from the text classification tool. The violence or a consequence of it represents internal obstacles of the victim to regulate her emotional experience and stress.

Keywords: intimate partner violence, word cloud, qualitative research.

I. Introduction

Violence against women, particularly intimate partner violence (IPV) is a major public health problem and a violation of women's human rights. Worldwide, 35% of women who have been in a relationship have experienced physical and/or sexual violence by their intimate partner. Based on World Health Organization data, women's lifetime exposure to intimate partner violence is associated with myriad health outcomes, like fatal outcomes, lead to injuries, depression, post-traumatic stress and other anxiety disorders, sleep difficulties, eating disorders, and suicide attempts (WHO, 2017). Not surprisingly, IPV is the second most common risk factor for disability-adjusted life years globally in women aged 20–24 years (Mokdad, 2016).

IPV is challenging to identify and address. Healthcare professionals play a significant role in identifying women who are usually exposed to domestic violence, identifying the signs of violence, protecting victims from experiencing violence again, and providing support to victims (Yaman Efe, 2012). Considering the significance of the issue, it is important to explore the speech of the victim at the time of the complaint, what are the most representative aspects in his speech, since it has been about violence for years. Why did you report it now? Which treatment is best suited to your needs?

We began to explore the victim's discourse to develop a model to understand the real needs of these victims at the time of reporting. Thus, patients benefit from more accurate treatment plans, avoiding prolonged periods of "trial and error" seeking the correct treatment to avoid revictimization, because women victims of domestic violence have difficulties in adhering to some treatment. The present study aims to analyze the text classification with word cloud as a tool to understand the pattern of patient functioning, complementing the qualitative analysis.

II. Methods

a) Study design

It is a text classification study with a word cloud analysis technique, complementing the qualitative analysis. It is complementary to a larger research, still in progress.

b) Sample

Fifty-six women victims of self-reported domestic violence, who came from a public service in South of Brazil. We included all women who were present on collection days in December 2017 and agreed to participate in the study.

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c) Instrument

We collect sociodemographic data from women such as: age, schooling level, family income, time of marital relationship, living with, use of drugs, existence of parental violence (transgenerationality of violence), among others. We also conducted the Operationalized Psychodynamic Diagnosis (OPD-2) Clinical Interview (Task Force, 2016). It is a semi-structured interview with specific interviewing tools for the exploration of each axis: I) "Module for the Evaluation of Domestic Violence OPD" proposed by the Chilean researcher Carla Crempien in 2009 in her PhD thesis (Crempien, 2009, 2012) and adapted to Brazil (Both et al. 2019), II) dysfunctional interpersonal pattern, III) intrapsychic conflicts, IV) structural functions (Task Force, 2016).

d) Data analysis

Python code was used as a base, which is available through the link https://www.geeksforgeeks.org/generating-word-cloud-python/. All prepositions and conjunctions were removed for the construction of the cloud.

III. Results

a) Study population

The sample had normal distribution ($p < 0.05$). The participants were 56 women aged 18-65 years (mean: 30, 07 years) who educational levels ranged from high school, income between 1 and 2 salaries. Table 1 presents the socio-demographic characteristics of the participants. The length of the marriages was in the range of 1-30 years, and 46, 4% were separated in less than 6 months (Table 2). Duration of violence is described in Table 3.

Table 1: Sociodemographic Data

Category	Subcategory	Women	Men
Age	18 to 20 years old	8 (14,3%)	3 (5,4%)
	21 to 25 years old	16 (28,6%)	5 (8,9%)
	26 to 30 years old	8 (14,3%)	16 (28,6%)
	31 to 35 years old	9 (16,1%)	13 (23,2%)
	36 to 40 years old	8 (14,3%)	4 (7,1%)
	41 to 45 years old	2 (3,6%)	5 (8,9%)
	46 to 50 years old	3 (5,4%)	5 (8,9%)
	51 to 55 years old	1 (1,8%)	1 (1,8%)
	56 to 60 years old	1 (1,8%)	2 (3,6%)
	61 to 65 years old	0	2 (3,6%)
Race	White	37 (66,1%)	35 (62,5%)
	Black	21 (21,4%)	13 (23,3%)
	Brown	6 (10,7%)	7 (12,5%)
	Indigenous	1 (1,8%)	1 (1,8%)
Scholarity	Illiterate	0	1 (1,8%)
	Incomplete elementary school	15 (26,8%)	17 (30,4%)
	Complete primary education	6 (10,7%)	6 (10,7%)
	Incomplete high school	8 (14,3%)	7 (12,5%)
	Complete high school	22 (39,3%)	22 (39,3%)
	Incomplete higher education	3 (5,4%)	1 (1,8%)
	Complete higher education	1 (1,8%)	2 (3,6%)
	Postgraduate studies	1 (1,8%)	0
Income	None	13 (23,2%)	8 (14,3%)
	Less than 1 salary	8 (14,3%)	1 (1,8%)
	Between 1 and 2 salaries	31 (55,4%)	35 (62,5%)
	Between 3 and 6 salaries	2 (3,6%)	5 (8,9%)
	Between 7 and 12 salaries	1 (1,8%)	2 (3,6%)
	More than 12 salaries	1 (1,8%)	4 (7,1%)
Religion	Godless	22 (39,3%)	26 (46,4%)
	Catholic	19 (33,9%)	15 (26,8%)
	Spititist	4 (7,1%)	3 (5,4%)
	Afro-Brazilian	3 (5,4%)	6 (10,7%)
	Evangelical	0	6 (10,7%)
Addiction	Alcohol	3 (5,4%)	25 (44,6%)
	Drug	2 (3,6%)	0
	Tobacco	8 (14,3%)	7 (12,5%)
	Marijuana	1 (1,8%)	7 (12,5%)

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	Cocaine	0	3 (5,4%)
	Marijuana and Cocaine	0	7 (12,5%)
	Anabolic	0	1 (1,8%)

Note. Income: 1 salary is a basic remuneration to the worker. Religion: Godless is the person who do not believe in God. Spiritism is the person who believe in life after death. Umbanda is the person who has several cults influenced by Indians.

Table 2: Relationship

Category	Subcategory	Women
Type of relationship	Date	1 (1,8%)
	Dating	9 (16,1%)
	Marriage	5 (8,9%)
	Stable union	8 (14,3%)
	Divorced	7 (12,5%)
	Separated in less than 6 months	26 (46,4%)
Time of relationship	Less than 6 months	3 (5,4%)
	Between 6 months and 1 year	6 (10,7%)
	Between 1 and 2 years	11 (19,6%)
	Between 3 and 5 years	13 (23,2%)
	Between 6 and 10 years	15 (26,8%)
	Between 11 and 15 years	2 (3,6)
	Between 16 and 20 years	4 (7,1%)
	Between 21 and 30 year	2 (3,6%)

Table 3: Duration of violence

Category	Frequency
< 6 months	18 (32,1%)
6-24 years	8 (14,3%)
2-5 years	14 (25%)
5-10 years	6 (10,7%)
> 10 years	10 (17,9%)

b) Word Cloud

Figure 1 shows the word cloud from the text classification tool.

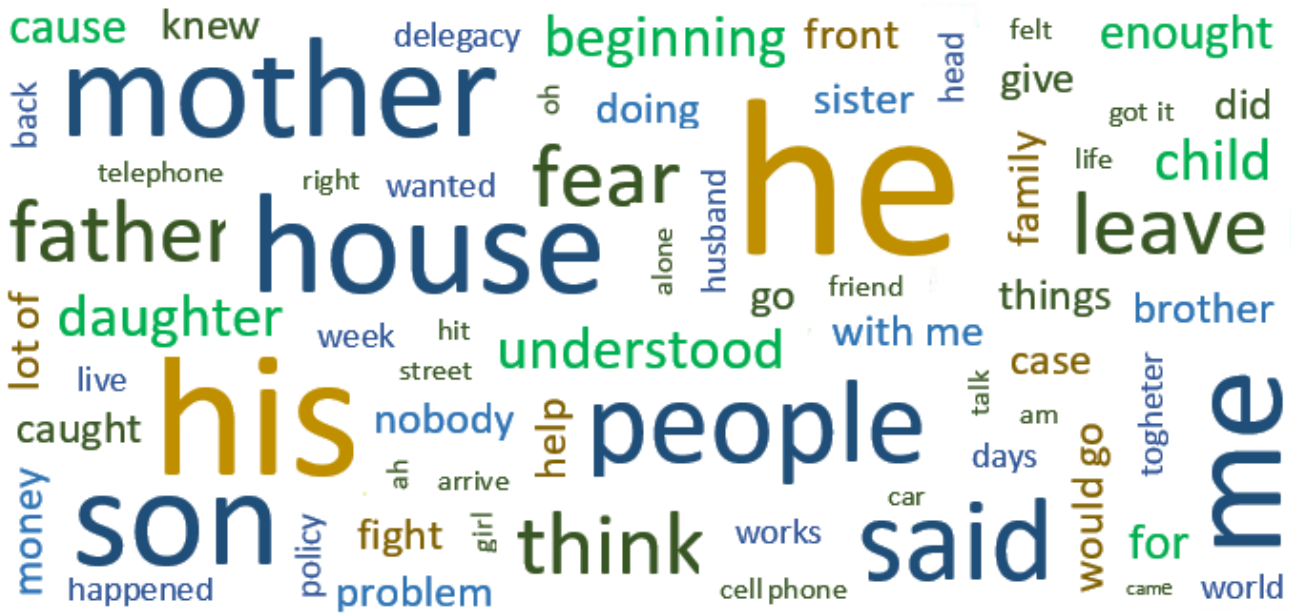

Figure 1: Word Cloud (n=56)

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IV. Discussion

According to Wild and collaborators (2018), evidence suggests that knowledge and skills rarely translate international guidelines and sustainable good practice. It is necessary to change support training and health leadership. For example, the National Action Plan on Gender-based Violence in Timor-Leste for training of trainers (SEM, 2017), WHO handbook for engaging health (WHO, 2017). Therefore, professionals and researchers need to understand the real needs during the reception and identification of women suffering from IPV.

The women's discourse in the interviews had focused on understanding what had really happened in their relationship, reporting their abusive situations. In this sense we highlight the words “problem”, “people” referring to the couple, “he”, “his”, what was said (“said”), the children involved (“son”, “daughter”, "child").

All women referred to the "beginning" of the relationship as different, whose husband was affectionate and caring, but over time this behavior changed. The husband had jealous and controlling behavior. This aspect is observed in the cycle of violence. Intimate partner violence tends to be systematic and chronic, the maltreatment goes through cycles in which violence episodes alternate with remorse and recompense; this has been described as the “cycle of violence”. IPV increases on severity along time (Walker, 2016).

In this sense, they concentrate part of the discourse reporting the cause (“cause”) of the violence. They attributed her husband's use of alcohol and drugs and her husband's jealousy that provoked aggression in his behavior. According to Zacan et al. (2013) and Crempien (2009) husband's drug use and jealousy is a relevant factor in IPV. This control is called psychological violence (Brasil, 2006). Women who suffered psychological violence reported significantly more controlling behaviors from their partners than non-victims. And from a clinical perspective, it has been reported its impact on women’s mental health, and its associations with depression, anxiety and posttraumatic stress disorder (García-Moreno, Jansen, Ellsberg, Heise, et al, 2006). The cause is also noted by the word “think” in the word cloud, in which participants tried to exploit partner violence.

Research suggested that social support is associated with less severe IPV (Schultz, Walls, & Grana, 2019, Crempien, 2012), specially with family (Wright, 2015).However, it is observed that the victim's speech was organized around the husband (words “he”, “his”, “father” of the children). Little said too much social relationships with friends or family. Another prevalent speech was the word "mother", but they referred in a negative sense, angry at early abandonment, lack of support. Also, companions limit them in relation to having a job, where they remain focused on raising children at home (Blanchard et al., 2018).

Studies point to the trangerationality of violence, whose father's perpetration of violence against the mother and child (Chiesa et al., 2018), with a co-occurrence rate of 75% (range 11–97%; Jouriles, McDonald, Slep, Heyman, & Garrido, 2008). There are many consequences for children exposed to IPV in mental and behavioral health (Johnson et al., 2002, Lapierre, 2010, Crempien, 2012).

Another word that stood out in the word cloud was the word "fear." The male perspective is characterized by abusive and coercive physical or non-physical conduct, with recognizable inequality of powers and play of forces. And regarding female behavior, there is the presence of fear with response of avoidance, adaptation and submission (Crempien, 2009; Blanchard et al., 2018). IPV presents with a slow and silent onset without physical aggression and gradually progresses to actions with greater intensity and humiliation (Leôncio et al., 2008). However, violence can be aggravated due to women's shame in reporting, lack of educational means and access to legal information and lack of assistance and protection (Signori, & Madureira, 2007). In this sense, it is necessary to combine effective assessment practices with preventive measures, such as psychoeducation and other screenings.

V. Text Classification Tools

In our previous reviews, the qualitative researches use content analysis about social and cultural issues (Hays & Emelianchik, 2009; Souto et al., 2019), program planners by thematic content analysis (coding and categorization for each interview question) in NVivo 10.0 (Blanchard et al., 2018), representations of domestic violence against women by software EVOC - Ensemble de Programmes Pemettant L´Analyse des Evocations (Silva et al., 2018; Gomes et al., 2015), describe the general violence situation by coding and recognizing themes or categories (Taherkhani et al., 2014), understand of pregnancy's experiences IPV by recognizing themes (Baird, Creedy, & Mitchell, 2017).

The aim of this study was to analyze the text classification with word cloud as a tool to understand the pattern of patient functioning, complementing the qualitative analysis. Thus, it was observed that it was possible to explore various questions of the participants using the word cloud.

VI. Implications for Clinical Practice and Public Healthy

According to a meta-analysis, there is an association between IPV and mental health problems (Bacchus, Ranganathan, Watts, Devries, 2018). The most important mental illnesses seen in women after

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domestic violence are post-traumatic stress disorder, anxiety disorder, and depression (Cengiz et al., 2014). High levels of IPV are associated with moderate suicide risks (Kavak et al., 2018).

During the reception of women, it is important to differentiate episodes of recent violence and violence that has occurred historically in women's lives, the duration and severity of IPV, risks of alcohol and other substance use, support network (Bacchus, Ranganathan, Watts, Devries, 2018). IPV is associated with a history of childhood trauma. Abusive experiences during childhood predispose victims to a higher risk of later revictimization. Thus, previous traumas resurface in current traumas that need to be elaborated and overcome dependence valuing their self-esteem (Sahin, Timur, Ergin, Taspinar, Balkaya, Cubukcu, 2010).

VII. Conclusion

This study was bold because it used text classification as a method of qualitative analysis. It was possible to understand the pattern of patient functioning from the text classification tool. Of particular importance to the population of this study, more research using word cloud to understand the mechanisms by which IPV may influence mental health.

A limitation of this study is its cross-sectional nature which impedes the establishment of temporal relations between the studied variables or the study of the self capacities, later to victims' reparation therapy and interdisciplinary interventions. Another limitation is the small sample size, where there are no subgroups to compare variables.

The risk for IPV and the ability to buffer effects of traumatic stressors on health outcomes is higher when the discourse of victim focuses only on the traumatic event. It is necessary to accommodate the patient's demand to understand the situation of violence, elaborate these issues and insert different interests (work, protection services, support network). Thus, it was possible to contribute to the enrichment of their difficulties and the treatment obstacles. Working through with the victim on these aspects, could lead to a more complete and realistic perception of herself and the others', as well as promoting her reflective function and affective regulation.

The violence or a consequence of it represents internal obstacles of the victim to regulate her emotional experience and stress. The treatment could contribute to the management in a differentiated way, diverse self capacities. Future research is recommendable to include a larger number of participants in order to go further in the study of these possible associations. Likewise, longitudinal studies are interesting to examine changes in self capacities during interventions.

VIII. Ethical Observations

1. *Conflicts of interest:* There are no conflicts of interest.
2. *Ethical Approval:* The work was approved by an institutional ethics committee and authorized to collect data at the corresponding institution.
3. *Consent:* The victims were invited voluntarily and authorized their participation in the research by signing the Term of Free and Informed Consent.
4. *Omission:* All data that could identify participants was omitted.

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By Kathleen G. De Leon, Jennifer P. Reyes & Ma. Cecilia O. Martinez

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Keywords: job burnout, performance of staff nurses, job burnout and performance of staff nurses.

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Job Burnout and Performance of Staff Nurses in Selected Hospitals in Metro Manila

Kathleen G. De Leon [α], Jennifer P. Reyes [σ] & Ma. Cecilia O. Martinez [ρ]

Abstract- This study was conducted to determine the job burnout and performance of staff nurses in selected tertiary hospitals in Manila using the Oldenburg Burnout Inventory. Results showed that there's: a high degree of agreement in relation to burnout of the staff-nurses in terms of exhaustion and disengagement; an average level of performance of the staff nurses in terms of task performance, contextual performance and counter-productive behavior; significant differences between the degrees of agreement in relation to job burnout of the staff-nurses (disengagement and exhaustion) when they are grouped according to nurse-patient ratio and census per area, and no significant differences for the rest of the profile variables except when group according to age in terms of exhaustion; a significant difference between the levels of performance of the staff nurses when grouped according to length of work experience as nurse practitioner as to task performance, contextual performance and overall performance; when they are grouped according to nurse-patient ratio as to task performance; when they are grouped according to census per area as task performance and counterproductive work behavior; significant relationships between the degree of agreement in relation to job burnout (disengagement) and overall level of performance of the staff nurses.

Keywords: job burnout, performance of staff nurses, job burnout and performance of staff nurses.

I. Introduction

Nowadays the prevalence of burnout in the profession of nursing is a real issue and a real threat to the health care system, more especially for the staff nurses working in tertiary hospitals. As Poghosyan, Aiken and Sloane (2009) reported, burnout appears to be a common phenomenon among nurses worldwide, with evidence indicating high proportions of nurses in North America, Europe, and Asia. This happens because nursing as a profession requires spending more time and energy. As Grubb and Grosch (2012) said, it is inevitably a demanding profession. It involves close association with patients, often in demanding circumstances as they work inside a high-tech healthcare environment constantly in direct connection with these patients who have different expectations and degrees of suffering. Their empathy for and connection with patients demonstrates core professional values which are essential but, consequently, attract certain factors capable of inducing tension and pressure.

As nurses themselves, the researchers often observed that many nurses suffer from burnout as they are associated with multiple and conflicting demands (being done on an extended 10 to 12 hours shift), imposed by their patients' needs; Some of them face various challenges at the job on a daily basis such as physical and emotional abuse from patients e.g. from substance abusers, violent or dissatisfied patients. Some feels that they lack recognition and positive feedback which led them to become demoralized. Other verbalized to the researchers that some of their co-workers, other health care providers, patients, clients and some physicians lack in showing respect to them. All these make these nurses feel somewhat unappreciated and undervalued producing significant toll on their physical and emotional wellbeing. According to Gunnarsdóttir, Clarke, Rafferty and Nutbeam (2009) this greater workloads and responsibilities predispose nurses to negative health outcomes (feeling of being exhausted, becoming overwhelmed, becoming short-tempered, and overall developing a high amount of stress) and may ultimately influence their performance and the quality of care.

The above conditions motivated the researchers to pursue this study, combined with the verbalizations of some of their colleagues that they have lost the enjoyment of their job; that they feel that their efforts were being unnoticed; and they feel overworked. In addition, as nurses the researchers also experience times that they cannot even have a good night's rest, feeling too tired to go to bed and wake up still feeling tired. They also feel that most nurses lack the time and energy to participate in home activities because of the excessive demand of their job.

Through this study, the degree of agreement in relation to job burnout of the staff-nurses and their level of performance were determined. This paved a way for hospital administrators to develop new plans and programs to help their staff nurses overcome their feelings of burnout, making them more energetic and enthusiasts in performing their job.

II. Method

This study utilized the descriptive type of research specifically the descriptive-correlational design

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to determine the job burnout and performance of staff nurses in selected tertiary hospitals in Manila.

III. Results

Problem 1: What is the profile of the staff nurses?

a) Personal profile

Table 1: Personal Profile of the Staff Nurses

Profile	Frequency	Percentage
Age		
20 - 29 years old	77	42.10%
30 - 39 years old	57	31.10%
40 – 49 years old	41	22.40%
50 – 59 years old	8	4.40%
Total	*183*	*100.00%*
Sex		
Male	57	31.10%
Female	126	68.90%
Total	*183*	*100.00%*
Marital Status		
Married	75	41.00%
Single	108	59.00%
Total	*183*	*100.00%*
Salary		
10,000 – 20,000 pesos	49	26.80%
More than 20,000 pesos	134	73.20%
Total	*183*	*100.00%*
Work Position		
Nurse 1	58	31.70%
Nurse 2	69	37.70%
Nurse 3	35	19.10%
Nurse 4 and up	21	11.50%
Total	*183*	*100.00%*
Unit of Practice		
General Wards	106	57.90%
Special Areas	61	33.30%
Other Areas / Office	16	8.70%
Total	*183*	*100.00%*
Length of Experience as Nurse Practitioner		
2 - 4 Years	55	30.10%
5 - 7 Years	52	28.40%
8 - 10 Years	40	21.90%
More than 10 Years	36	19.70%
Total	*183*	*100.00%*

Table 1 presents the personal profile of the staff nurses. In terms of age, results showed that generally the staff nurse-respondents belonged to the 20 – 29 years old group with 77 out of 183 or 42.10%; in terms of sex, mostly they are female with 126 out of 183 or 68.90%; Basically, this finding show that the respondents are female dominated; in terms of marital status, most of the staff nurse-respondents are single with 108 out of 183 or 59.0%; in terms of salary, most of them are earning more than 20,000 pesos with 134 out of 183 or 73.20%; in terms of work position, most of them are Nurse 2 with 69 out of 183 or 37.70%; in terms of unit of practice, mostly they are assigned in the general wards (OB Ward, Medical Ward, Surgery Ward, Pediatric Ward, Pay Ward) with 106 out of 183 or 57.90%; lastly in terms of length of practice as nurse practitioner, they mostly belonged in the 2 to 4 years with 55 out of 183 or 30.10%.

b) Work Profile

Table 2: Work Profile of the Staff Nurses

Profile	Frequency	Percentage
Nurse-Patient Ratio		
1 Nurse to below 10 Patients	58	31.70%
1 Nurse to 10 - 19 Patients	50	27.30%
1 Nurse to 20 To 29 Patients	35	19.10%
1 Nurse to 30 To 39 Patients	40	21.90%
Total	*183*	*100.00%*
Census per Area		
Below 10	67	36.60%
10 – 19	10	5.50%
20 – 29	16	8.70%
30 – 39	19	10.40%
40 – 49	20	10.90%
50 – 59	24	13.10%
60 and more	27	14.80%
Total	*183*	*100.00%*

Table 2 presents the work profile of the staff nurses. In terms of nurse-patient ratio, results shows that generally the staff nurse-respondents works with ratio of 1 nurse to less than 10 patients with 58 out of 183 or 31.70%; in terms of census per area, most of the staff nurse-respondents works with a census of less than 10 patients with 67 out of 183 or 36.60%;

Problem 2: What is the degree of agreement in relation to job burnout of the staff-nurses using the Oldenburg Burnout Inventory (OLBI)?

a) Exhaustion

Table 3 displays the degree of agreement in relation to job burnout of the staff-nurses using the Oldenburg Burnout Inventory (OLBI) in terms exhaustion, with an overall mean score of 2.60 interpreted as high degree of agreement in relation to burnout. This finding implies that the staff nurses have been highly experiencing burnout in terms of exhaustion; and is manifested by both physical fatigue (physical exhaustion that stops a person from being able to function normally) and a sense of feeling psychologically and emotionally "drained." These are the unusual feeling of tiredness or drowsiness especially when at work. When this happen, nurses becomes cynical about their value or the value of their occupation and even doubt their own capacity to perform as staff nurses. This kind of feeling can be traced from the modern nursing working structures that tremendously evolved through the years (and still evolving). According to Kozier et al (2011) modern nursing working structures

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range from: care giving (taking into account the whole (physical, cultural, spiritual, emotional and developmental) aspects of the patient/client, being a teacher (imparting or providing health education to patients/clients with), being an advocate (taking into consideration the patients' rights and making lawful decisions on behalf of the patients when they are unable to do so), being a communicator (talking in sense with patients and their families as effective communication supports healing), being a decision maker and managers. According to the authors, all of these roles are very important and are dependent on each other in order to make the patient/client healing process successful. The implications for this finding (high degree of agreement in relation to burnout) in terms of exhaustion include simultaneous experience of high levels of chronic fatigue, and to distance themselves emotionally and cognitively from their work activities. The staff nurses' feelings of powerlessness, isolation, and low self-esteem would lead to inability to act in a professionally autonomous manner on behalf of patients. The worst analogy of this finding is that, the nurses may not believe in themselves anymore as to how they can be of service to others. They will start to lack self-concept which is very important, as it is their perceptions of self that often affects their patient care quality and safety. This finding is confirmed by the works of Cheung and Chow (2011) which reported that burnout among health care providers relates to their well-being, the quality of life of their patients, and caring effectiveness.

Table 3: Degree of Agreement in Relation to Job Burnout of the Staff-Nurses Using the Oldenburg Burnout Inventory (OLBI) in Terms of Exhaustion

Items	WM	Ranking	Interpretation
2. There are days when I feel tired before I arrive at work	3.09	2	High Degree of Agreement in relation to Burnout
4. After work, I tend to need more time than in the past in order to relax and feel better	3.17	1	High Degree of Agreement in relation to Burnout
5. I can tolerate the pressure of my work very well	1.95	7	Low Degree of Agreement in relation to Burnout
8. During my work, I often feel emotionally drained	2.75	5	High Degree of Agreement in relation to Burnout
10. After working, I have enough energy for my leisure activities.	2.24	6	High Degree of Agreement in relation to Burnout
12. After my work, I usually feel worn out and weary	2.76	4	High Degree of Agreement in relation to Burnout
14. Usually, I can manage the amount of my work well	1.91	8	Low Degree of Agreement in relation to Burnout
16. When I work, I usually feel energize	2.95	3	High Degree of Agreement in relation to Burnout
Overall Mean Score	*2.60*		*High Degree of Agreement in Relation to Burnout*

Legend:	
WM = Weighted Mean Range	Interpretation
3.25 – 4.00	Very High Degree of Agreement in relation to Burnout
2.50 - 3.24	High Degree of Agreement in relation to Burnout
1.75 – 2.49	Low Degree of Agreement in relation to Burnout
1.00 - 1.74	Very Low Degree of Agreement in relation to Burnout

Another support for the finding above is the work of Iglesias, Vallejo and Fuentes (2010) which reported that bodily and emotional exhaustion is the effect of job burnout which includes being pessimistic on their job, resigning and having negative feelings toward the customers and the clients. In other words, according to the authors, this syndrome is related to bodily problems, psychological health and variables of job performance like being unsatisfied about job, absenteeism and efficacy.

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b) *Disengagement*

Table 4: Degree of Agreement in Relation to Job Burnout of the Staff-Nurses using the Oldenburg Burnout Inventory (OLBI) in Terms of Disengagement

Items	WM	Ranking	Interpretation
1. I always find new and interesting aspects in my work	1.97	7	Low Degree of Agreement in relation to Burnout
3. It happens more and more often that I talk about my work in a negative way.	2.63	5	High Degree of Agreement in relation to Burnout
6. Lately, I tend to think less at work and do my job almost mechanically.	2.81	2	High Degree of Agreement in relation to Burnout
7. I find my work to be a positive challenge.	1.81	8	Low Degree of Agreement in relation to Burnout
9. Over time, one can become disconnected from this type of work.	2.72	3	High Degree of Agreement in relation to Burnout
11. Sometimes I feel sickened by my work tasks.	2.90	1	High Degree of Agreement in relation to Burnout
13. This is the only type of work that I can imagine myself doing.	2.64	4	High Degree of Agreement in relation to Burnout
15. I feel more and more engaged in my work.	2.05	6	High Degree of Agreement in relation to Burnout
Overall Mean Score	*2.44*		*High Degree of Agreement in relation to Burnout*

Table 4 shows the degree of agreement in relation to job burnout of the staff-nurses using the Oldenburg Burnout Inventory (OLBI) in terms disengagement, with an overall mean score of 2.44 interpreted as high degree of agreement. This shows that the staff nurses have been highly experiencing burnout in terms of disengagement; manifested by decreased eye contact, increased physical distance with the patient / client, and increased task focused behavior. Nurses do this kind of attitude because they were cynical about their value or the value of their occupation and were doubtful about their own capacity to perform as staff nurses. The doubts made them think they cannot anymore continue to do their job well so they focused more on the tasks at hand and less interpersonal relationships with their patients / clients, so they will not make any errors. This happens when nurses were having workloads that are more than they can handle especially when the conditions in the work environment influenced their process of disengagement such as the lack of time, the culture of productivity (hospital administrations admit more patients that the hospital can handle and mandate their nurses to render safe and quality care for them) and patient characteristics (annoying, demanding, treat nurses as their maid or helpers). It can be denoted that disengagement of staff nurses is likely a direct consequence of practice environments that ultimately have impacts on both staff and patient outcomes. This finding is also similar to the works of Sharma et al (2014) which reported that 80% of nurses had no time for rest and found their job tiring. This need to rest and relax came from the staff nurse-respondents feeling of becoming powerless and cannot anymore work efficiently with their patients as stated above. Cause of this needs are workload, work hours, work structures, and many other factors which indirectly or directly cause their feeling of burnout.

Problem 3: What is the level of performance of the staff nurses in terms of

a) *Task Performance*

Table 5: Level of Performance of the Staff Nurses In Terms of Task Performance

Items	WM	Ranking	Interpretation
1. I was able to plan my work so that I finished it on time.	2.64	3	Average Level of Performance
2. I kept in mind the work result I needed to achieve.	2.77	1	Average Level of Performance
3. I was able to set priorities.	2.69	2	Average Level of Performance
4. I was able to carry out my work efficiently.	2.61	5	Average Level of Performance
5. I managed my time well.	2.63	4	Average Level of Performance
Overall Mean Score	*2.67*		*Average Level of Performance*

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Legend:			
Interpretation	Pink Collar		
	TP	CP	CWB
Very Low (< = 10th Percentile)	<=1.83	<= 1.25	<= 0.00
Low (10th – 25th Percentile)	1.84 – 2.32	1.26 – 1.74	0.01 – 0.59
Average (25th - 75th Percentile)	2.33 – 2.99	1.75 – 2.87	0.60 – 1.59
High (75th – 90th Percentile)	3.00 – 3.49	2.88 – 3.12	1.60 – 1.99
Very High (> = 90th Percentile)	>= 3.50	>= 3.13	>= 2.00

TP = Task Performance
CP = Contextual Performance
CWB = Counter-Productive Work Behavior

Table 5 shows the level of performance of the staff nurses in terms of task performance, with 2.67 as its overall mean score interpreted as average level of performance. This indicates that the staff nurse-respondents are moderately doing well in their job. The rationale for this is that their performance as nurses are critical to the delivery of quality patient care, therefore, even if they feel burnout, they still perform their tasks. They cannot just abandon their patients because they feel low or sad about their work; their job means life is at stake and it cannot be redo or rewritten like that job of a clerk in an office. They are mandated by Philippine Code of Ethics for Nurses, that every day they need to support each other in order to fulfill their ethical considerations to patients and public. The Code supports nurses in providing consistently respectful, humane, and dignified care. This means that every nurse has a moral obligation to care for their patients. This finding is similar to the study by Gandi, beben and Gyarazama (2011) which reported that nurses felt they were doing their job very well, having on average high levels of personal accomplishment.

b) Contextual Performance

Table 6: Level of Performance of the Staff Nurses in Terms of Contextual Performance

Items	WM	Ranking	Interpretation
6. on my own initiative, I started new tasks when my old tasks were completed.	2.40	2	Average Level of Performance
7. I took on challenging tasks when they were available.	2.35	4	Average Level of Performance
8. I worked on keeping my job-related knowledge up-to-date.	2.39	3	Average Level of Performance
9. I worked on keeping my work skills up-to-date.	2.43	1	Average Level of Performance
10. I came up with creative solutions for new problems.	2.26	6.5	Average Level of Performance
11. I took on extra responsibilities.	2.27	5	Average Level of Performance
12. I continually sought new challenge in my work.	2.22	8	Average Level of Performance
13. I actively participated in meeting and/or consultations.	2.26	6.5	Average Level of Performance
Overall Mean Score	*2.32*		*Average Level of Performance*

Table 6 illustrates the level of performance of the staff nurses in terms of contextual performance, with 2.32 as its overall mean score, interpreted as average level of performance. This specifies that the staff nurse-respondents were performing moderately the tasks that involve those behaviors not directly related to their job tasks, but having a significant impact on organizational, social, and psychological contexts. This happens because they are nurses and they do their job for positive patient outcomes as well as for the good of the organization that they work for; inculcating in their minds the ethics that nurses need to follow every time they have to perform their caring attitude for their patients. The implications for this is that staff nurses knew how to follow organizational rules and procedures; as well as how to endorse, support, and defend their organizational objectives, which are good qualities of a professional nurse. This finding is supported by the

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works of Ployhart, Schneider and Schmitt (2006) which stated that contextual or civic activities support and create the context or social environment in which the technical core of the organization must function; while task activities serve to support and create the technical core itself. Supporting also to this claim is the works of Altindis (2011) which said that job performance is a function of motivation.

c) *Counterproductive Work Behavior*

Table 7: Level of Performance of the Staff Nurses in terms of Counterproductive Work Behavior

Items	WM	Ranking	Interpretation
14. I complained about minor work-related issues at work.	0.98	2	Average Level of Performance
15. I made problems at work bigger that they were.	0.50	5	Low Level of Performance
16. I focused on the negative aspects of situation at work instead of positive aspects.	0.72	4	Average Level of Performance
17. I talked to colleagues about the negative aspects of my work.	1.06	1	Average Level of Performance
18. I talked to people outside the organization about the negative aspects of my work.	0.87	3	Average Level of Performance
Overall Mean Score	*0.83*		*Average Level of Performance*

Table 7 illustrates the level of performance of the staff nurses in terms of counter-productive behavior, with 0.83 as its overall mean score, interpreted as average level of performance. This shows that the staff nurse-respondents were moderately performing behavior that undermines the goals and interests of the hospital. This kind of performance comes in many different forms, but can include tardiness, theft, fraud, sexual harassment, workplace bullying, absenteeism, substance abuse, workplace aggression, or sabotage. Nurses do this kind of attitude at work because of the burnout they feel about it. Sometimes this helps them cope with the major intrigues that work gave them; others do this to take revenge; some do this for the pleasure of just doing it in order to counteract the negative sides of their work. The implication for this is not good. These types of behavior not only impacted the quality of work produced by the staff nurses engaging in counter-productive behaviors but also can negatively affect the productivity of other employees in the hospital and create undesirable risks for the hospital administration. In general, the hospital administration should seek to hire individuals or professional nurses who are less likely to engage in any counterproductive work behaviors. Another helpful intervention is pre-employment tests which can help assess the likelihood that an individual is more prone to this kind of behaviors. Specifically, behavioral tests and integrity/honesty tests can help employers mitigate risk related to counterproductive work behaviors by measuring conscientiousness, rule adherence, attitudes towards theft, and overall reliability. This finding is supported by the works of Spector (2012) which reported that counterproductive work behavior consist of employees engaging in physical and verbal aggression, directing hostile and nasty behavior at co-worker, destroying organizational property, purposely doing work incorrectly, stealing, sabotage, theft, and withholding task performance.

Problem 4: Is there a significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when grouped according to the profile variables?

a) *Age*

Table 8: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According Age

Degrees of Agreement in Relation to Job Burnout	Age	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	20 - 29 Years Old	86.34	3	3.752	.290	*Accept Ho*	*No Significant Difference*
	30 - 39 Years Old	94.33					
	40 - 49 Years Old	102.98					
	50 - 59 Years Old	73.63					
	60 and above Years Old	86.34					
Exhaustion	20 - 29 Years Old	86.61	3	1.603	.659	*Accept Ho*	*No Significant Difference*
	30 - 39 Years Old	96.04					
	40 - 49 Years Old	94.33					
	50 - 59 Years Old	103.13					
	60 and above Years Old	86.61					

Legend: If the *p*-value is < 0.05- reject the null hypothesis; there is a significant difference; If the *p*-value is > 0.05 - Accept the null hypothesis; there is no significant difference.

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Table 8 shows the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to age. The Kruskall-Wallis H test showed that there were no statistically significant differences between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to age: a) in terms of disengagement as determine by X^2 (3)= 3.752, p = 0.290, with mean rank scores of: 86.34 for 20-29 years old, 94.33 for 30-39 years old, 102.98 for 40 -49 years old, 73.63 for 50-59 years old, 86.34 for 60 years old and above; b) also in terms of exhaustion as determine by X^2 (3)= 1.603, p = .659, with mean rank scores of: 86.61 for 20-29 years old, 96.04 for 30-39 years old, 94.33 for 40-49 years old, 103.13 for 50-59 years old, 86.61 for 60 years old and above. These findings mean that age does not affect the degrees of agreement in relation to job burnout of the staff-nurses (disengagement and exhaustion). This is because burnout happens to all people of all ages and for nurses, they just treat this as one of the consequences of being on the job of caring for people until they become well. This finding is confirmed by the works of Toode (2015) which reported that the interest in nursing work itself has nothing to do with nurses' age, as the internal motivation to work was as common among older hospital nurses as it was in their younger counterparts.

The above findings can be attributed also to the fact that most of the staff nurse-respondents belonged to the 20-29 years old population (young and new nurses population) where specific features of personality arises such that being enthusiastic on the job, motivated and highly energetic, that was why they have the same attitude towards burnout; which is contrary to the studies of Tomic and colleagues (2004), Lackritz (2004) and Ahola and colleagues (2005) that showed that there is a significant relationship between burnout and age.

b) Sex

Table 9: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Sex

Degrees of Agreement in Relation To Job Burnout	Sex	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	Male	89.04	1	.262	.609	*Accept Ho*	*No Significant Difference*
	Female	93.34					
Exhaustion	Male	76.34	1	7.428	.006	*Reject Ho*	*Significant Difference*
	Female	99.08					

Table 9 displays the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to sex. The Kruskall-Wallis H test showed that there was no statistically significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to sex, in terms of disengagement, as determined by X^2 (1) = 0.262, p = 0.609, with mean rank scores of: 89.04 for male and 93.34 for females; however in terms of exhaustion, there was a statistically significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to sex as determined by X^2 (1)= 7.428, p = 0.006, with mean rank scores of: 76.34 for male and 99.08 for females. These findings show that in terms of disengagement, whatever sex that the staff nurses have, they still have the same attitude or degree of agreement towards burnout. This is because nurses regardless of sex are mandated to do their job according to the realms of their Code of Conduct. That is why when they want to disconnect themselves to their work; they just focus on the tasks being performed in order to still protect their patients and self. It is in the culture also as a Filipino to care for anyone (as it was taught at home) even if they are not in the good mood to do so. This finding is somehow similar to that of Maslach, Schaufeli and Leiter (2001) wherein the demographic variable of sex has not been a strong predictor of burnout. Again, this finding can be attributed to the profile of the staff nurse –respondents which is mostly female, that was why they have the same attitude or degree of agreement towards burnout in terms of disengagement.

In terms of exhaustion, there was a significant difference between male and female because females easily get tired and has less strength to carry on tasks especially when they are on a long shift per day. This is actually a fact based on the physical structure of both sexes. Men are physically stronger than women, on average as confirmed by the study of Hoffman, Policastro, Quick and Lee (2006) which found that men had an average of 26 lbs. (12 kilograms) more skeletal muscle mass than women.

The finding of significant difference between male and female in terms of exhaustion is similar to the studies by many authors from Shenyang, China (Li, Guan, Chang and Zhang, 2014), Japan (Yao, Yao, Wang, Li and Lan, 2013), and Nigeria (Lasebukan and Oyetunde, 2013) which reported that females were found to suffer more emotional exhaustion than their male colleagues.

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c) *Marital Status*

Table 10: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Marital Status

Degrees of Agreement in Relation To Job Burnout	Marital Status	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	Married	97.07	1	1.178	.278	*Accept Ho*	*No Significant Difference*
	Single	88.48					
Exhaustion	Married	91.99	1	.000	.998	*Accept Ho*	*No Significant Difference*
	Single	92.01					

Table 10 displays the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to marital status. The Kruskall-Wallis H test showed that there were no statistically significant differences between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to marital status: a) in terms of disengagement as determine by X^2 (1)= 1.178, p = 0.278 with mean rank scores of: 97.07 for married and 88.48 for single; b) also in terms of exhaustion as determine by X^2 (1)= 0.000, p = 0.998 with mean rank scores of: 91.99 for married and 92.01 for single.

The finding above shows that marital status does not affect or influence the feelings of burnout for the staff nurse-respondents. This is because nurses again are mandated to perform their tasks according to their Code of Ethics. Their resilience enabled them to cope with their work despite all the challenges that burnout give them may they be married or single. Nurses have the ability to pull through or cope successfully despite substantial hardship at work because they knew that they are dealing with people's lives which they cannot just ignore. This is confirmed by the works of Manzano and Ayala-Calvo (2012) which said that resilient nurses learn to overcome difficulties and develop better coping mechanisms to address burnout through exposure to difficult working situations and environments.

In addition, the finding of this study is contrary to that of most studies which found that nurses who were married were more prone to emotional exhaustion (Li, Guan, Chang and Zhang, 2014; Ohue, Moriyama and nakaya, 2011; Xie, Wang and Chen, 2011), while others reported that single participants scored significantly higher than the married participants (Yao, Yao, Wang, Li, Lan, 2013).

d) *Salary*

Table 11 presents the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to salary. The Kruskall-Wallis H test showed that there were no statistically significant differences between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to salary: a) in terms of disengagement, as determine by X^2 (1)= 1.215, p = 0.270 with mean rank scores of: 99.10 for 10,000 – 20,000 pesos salary and 89.40 for more than 20,000 pesos salary; b) also in terms of exhaustion, as determine by X^2 (1)= 0.283, p = 0.595 with mean rank scores of: 88.60 for 10,000 – 20,000 pesos salary and 93.24 for more than 20,000 pesos salary.

Table 11: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Salary

Degrees of Agreement in Relation To Job Burnout	Salary	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	10,000 - 20,000 pesos	99.10	1	1.215	.270	*Accept Ho*	*No Significant Difference*
	more than 20,000 pesos	89.40					
Exhaustion	10,000 - 20,000 pesos	88.60	1	0.283	.595	*Accept Ho*	*No Significant Difference*
	more than 20,000 pesos	93.24					

The finding above signifies that salary of the staff nurse-respondents does not affect their feeling of disengagement and exhaustion. This is because the salaries of the nurses at these hospitals are standardized and according to their work position (since most of them have the same salary bracket of more than 20,000 pesos and mostly Nurse 2). Working in a government hospital means that the nurses knew what kind of salary they have to get based on their position at work, therefore they cannot attest to this fact and ask for more just to augment their feeling of burnout. The finding of this study is contrary to that of Yang and Wang (2015), which found out that nurses with different monthly income have significant differences in the life satisfaction dimensions and total score of subjective well-being.

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e) *Work Position*

Table 12: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Work Position

Degrees of Agreement in Relation To Job Burnout	Work Position	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	Nurse 1	90.75	3	5.882	.117	*Accept Ho*	*No Significant Difference*
	Nurse 2	86.59					
	Nurse 3	110.66					
	Nurse 4 and Up	82.14					
Exhaustion	Nurse 1	86.42	3	2.877	.411	*Accept Ho*	*No Significant Difference*
	Nurse 2	90.68					
	Nurse 3	93.86					
	Nurse 4 and Up	108.64					

Table 12 presents the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to work position. The Kruskall-Wallis H test showed that there was no statistically significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to work position: a) in terms of disengagement, as determine by X^2 (3)= 5.882, p = 0.117 with mean rank scores of: 90.75 for Nurse 1, 86.59 for Nurse 2, 110.66 for Nurse 3, 82.14 for Nurse 4 and up; b) also in terms of exhaustion, as determine by X^2 (3)= 2.877, p = 0.411 with mean rank scores of: 86.42 for Nurse 1, 90.68 for Nurse 2, 93.86 for Nurse 3, 108.64 for Nurse 4 and up.

The finding of no significant difference above implies that the work position of the staff nurse-respondents does not affect their feeling of disengagement and exhaustion. This is because they are mostly Nurse 2, mostly advance beginner nurses. They are just beginning to master the different aspects of nursing as they construct a professional identity. They usually work based on organizational, educational, and personal strategies that are important to their development, including tailored orientation, opportunities for skill acquisition, and personal support. This is why they are compelled to be instructed, to follow/obey what tasks are given to them and how they would execute/perform these tasks. This is supported by the works of Benner (1984) which said that nurses at the advanced beginner stage use learned procedures and rules to determine what actions are required for the immediate situation.

The findings above is contrary to that of Queiros et al's (2013) and those of Lasebikan and Oyetunde (2013) which reported that job rank has also been found to play a significant role in burnout, with literature suggesting that the higher an individual's rank, the higher his scores on personal accomplishment.

f) *Unit of Practice*

Table 13: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Unit of Practice

Degrees of Agreement in Relation To Job Burnout	Unit of Practice	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	General Wards	98.85	2	6.672	.036	*Reject Ho*	*Significant Difference*
	Special Areas	87.35					
	Other Areas	64.34					
Exhaustion	General Wards	90.00	2	.627	.731	*Accept Ho*	*No Significant Difference*
	Special Areas	96.30					
	Other Areas	88.88					

Table 13 shows the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to unit of practice. The Kruskall-Wallis H test showed that there was a statistically significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to unit of practice in terms of disengagement as determine by X^2 (2)= 6.672, p = 0.036 with mean rank scores of: 98.85 for General Wards, 87.35 for Special Areas, 64.34 for Other Areas; however there was no statistically significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to unit of practice in terms of exhaustion as determine by X^2 (2)= 0.627, p = 0.731 with mean rank scores of: 90.00 for General Wards, 96.30 for Special Areas, 88.88 for Other Areas.

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The above finding implies that in terms of disengagement, there were significant differences for the staff nurse-respondents in terms of unit of practice. The reason for this is that different unit in the hospitals have different workloads of nurses, different kinds of patients turn-overs and different status of work being facilitated. Staff nurses when feeling disengaged becomes focus on their tasks and does not mind other people around even their patients, so if they are assigned in the special areas which have few nurses assigned but with high turn-over of patients (which made them see and care for them for just a short period of time), they just stayed focused on performing the tasks assigned to them and in a fast pace also because their condition are critical and need constant assessment and evaluation; on the other hand, if they care for patients at the general wards (with more nurses assigned than in special wards, who extends time to be accommodated as long as they are recuperating from their illness) they need to care for them for longer periods of time with completion of almost the same tasks every day. Practically nurses can be more disengaged in the Special Areas than in the General Wards because of this condition. This is supported by the works of Duffield, Roche, Merrick (2006) which suggested that a higher proportion of registered nurses in the nursing staff results in lower workload, less disengagement and better patient outcomes.

g) Length of Work Experience as Nurse Practitioner

Table 14 displays the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to length of work experience as nurse practitioner. The Kruskall-Wallis H test showed that there were no statistically significant differences between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to length of work experience as nurse practitioner: a) in terms of disengagement, as determine by X^2 (3)= .629, p = 0.890 with mean rank scores of: 96.44 for 2-4 years, 89.47 for 5-7 years, 89.13 for 8-10 years and 92.07 for more than 10 years; b) also in terms of exhaustion, as determine by X^2 (3)= 3.181, p = 0.365 with mean rank scores of: 93.45 for 2-4 years, 101.21 for 5-7 years, 85.49 for 8-10 years and 83.72 for more than 10 years.

Table 14: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Length of Experience as Nurse Practitioner

Degrees of Agreement in Relation To Job Burnout	Length of Work Experience	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	2 - 4 Years	96.44	3	.629	.890	*Accept Ho*	*No Significant Difference*
	5 - 7 Years	89.47					
	8 - 10 Years	89.13					
	More than 10 Years	92.07					
Exhaustion	2 - 4 Years	93.45	3	3.181	.365	*Accept Ho*	*No Significant Difference*
	5 - 7 Years	101.21					
	8 - 10 Years	85.49					
	More than 10 Years	83.72					

The finding of no significant difference above implies that the length of work experience as nurse practitioner of the staff nurse-respondents does not affect their feeling of disengagement and exhaustion. This is because of the fact that most of them are in the 2-4 years of work experience which means they are mostly new in their career as nurses. Beginning nurses are those who strive to make it good all the time in order for them to be retained and be promoted. They managed to follow rules and regulations as they are those nurses who need support from their head nurses or supervisors in order to perform their tasks well.

In general, nurses had a lifelong commitment to their careers, and that they have to perform "well" in their jobs in accordance with standards. These positive characteristics of the nurse include, but are not limited to, their positive work history, high professionalism, intention to remain in the job and high job motivation, which are all predictive of high job performance. To support this finding is the works of Yang and Wang (2015) which said that age influences nurses' job burnout, younger nurses are more likely to take on more work tasks and are committed on it.

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h) Nurse-Patient Ratio

Table 15: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Nurse-Patient Ratio

Degrees of Agreement in Relation To Job Burnout	Nurse-Patient Ratio	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	1 Nurse To Below 10 Patients	65.97	3	29.640	.000	*Reject Ho*	*Significant Difference*
	I Nurse To 10 - 19 Patients	93.17					
	1 Nurse To 20 To 29 Patients	96.31					
	1 Nurse To 30 To 39 Patients	124.51					
Exhaustion	1 Nurse To Below 10 Patients	86.90	3	7.870	.049	*Reject Ho*	*Significant Difference*
	I Nurse To 10 - 19 Patients	80.44					
	1 Nurse To 20 To 29 Patients	110.56					
	1 Nurse To 30 To 39 Patients	97.61					

Table 15 presents the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to nurse – patient ratio. The Kruskall-Wallis H test showed that there were statistically significant differences between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to nurse-patient ratio: a) in terms of disengagement as determine by X^2 (3)= 29.640, p = 0.000 with mean rank scores of: 65.97 for 1 nurse to below 10 patients, 93.17 for 1 nurse to 10-19 patients, 96.31 for 1 nurse to 20-29 patients, and 124.51 for 1 nurse to 30-39 patients; b) also in terms of exhaustion, as determine by X^2 (3)= 7.870, p = 0.049 with mean rank scores of: 86.90 for 1 nurse to below 10 patients, 80.44 for 1 nurse to 10-19 patients, 110.56 for 1 nurse to 20-29 patients, and 97.61 for 1 nurse to 30-39 patients.

The finding above implies that the nurse-patient ratio really affects their degree of agreement when it comes to burnout. This can be rationalized from the fact that heavy workloads is different from those light workloads as far as nursing is concern. Although most of the nurses were having only 1 nurse to 10 to 19 patients, this kind of workload can be heavy for some or light to some. This is why nurses have differences in their attitude towards burnout. Heavy workloads for nurses mean that they are given more than what they can handle. This heavy workloads are in terms of the number of patients and the number of tasks to be perform for them; the more number of patients given, the more tasks lime vital signs monitoring, feeding, medications administration every now and then, charting the doctor's orders and carrying them all out. If these workloads are not carried out, adverse patient outcomes will result. Similarly Ball et al (2014) postulated that when care is not done or "missed", the quality and safety of patient care may be compromised.

The finding above is also supported by the works of Laschinger, Finegan andWilk (2011) which reported that high burnout levels in nursing have been associated with heavy workloads.

i) Census per area

Table 16: Degrees of Agreement in Relation to Job Burnout of the Staff-Nurses When Grouped According to Census per Area

Degrees of Agreement in Relation To Job Burnout	Census per Area	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Disengagement	Below 10	65.49	6	59.475	.000	*Reject Ho*	*Significant Difference*
	10 - 19	20.80					
	20 - 29	108.47					
	30 - 39	114.58					
	40 - 49	104.55					
	50 - 59	113.56					
	60 and More	130.04					
Exhaustion	Below 10	86.71	6	24.656	.000	*Reject Ho*	*Significant Difference*
	10 - 19	22.15					
	20 - 29	101.69					
	30 - 39	86.00					
	40 - 49	105.08					
	50 - 59	107.81					
	60 and More	105.74					

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Table 16 presents the significant difference between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to census per area. The Kruskall-Wallis H test showed that there were statistically significant differences between the degrees of agreement in relation to job burnout of the staff-nurses when they are grouped according to census per area: a) in terms of disengagement, as determine by X^2 (6)= 59.475, p = 0.000 with mean rank scores of: 65.49 for below 10, 20.80 for 10-19, 108.47 for 20-29, 114.58 for 30-39, 104.55 for 40-49, 113.56 for 50-59 and 130.04 for 60 and more; b) also in terms of exhaustion, as determine by X^2 (6)= 24.656, p = 0.000 with mean rank scores of: 86.71 for below 10, 22.15 for 10-19, 101.69 for 20-29, 86.00 for 30-39, 105.08 for 40-49, 107.81 for 50-59 and 105.74 for 60 and more.

The finding above implies that the census per area also affects their degree of agreement when it comes to burnout. This can be traced from the fact that different areas have different census per area of patient. The most loaded would be are the general wards which is where the patients go when they are recuperating from sickness; while in the special areas, there is a fast turnover of patients that is why mostly they have only below 10 census in their area. This causes the differences in the degrees of agreement in relation to job burnout of the staff-nurses (disengagement and exhaustion) when they are grouped according to census per area. This finding is supported by the works of Mensik (2013) which stated that staffing typically is a day-of-operations function in which designated persons assess and determine the shift-to-shift ratio of nurses to patients to ensure adequate staffing on each shift and unit. In most hospitals, staff assignments are for a particular shift on a specific patient care unit. Thus, for a hospital, the most disaggregated level of nurse staffing measurement available is usually the patient care unit. Patient care units can be aggregated by type of care they provide; for example, a hospital might have five medical–surgical care units that can be grouped together. Finally, all hospital units can be aggregated to the level of the hospital.

Problem 5: Is there a significant difference between the levels of performance of the staff nurses when grouped according to the profile variables?

a) Age

Table 17: Levels of Performance of the Staff Nurses When Grouped According to Age

Level of Performance	Age	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Task Performance	20 - 29 Years Old	84.47	3	4.231	.238	*Accept Ho*	*No Significant Difference*
	30 - 39 Years Old	99.47					
	40 - 49 Years Old	91.29					
	50 - 59 Years Old	114.81					
Contextual Performance	20 - 29 Years Old	90.79	3	1.072	.784	*Accept Ho*	*No Significant Difference*
	30 - 39 Years Old	88.76					
	40 - 49 Years Old	95.99					
	50 - 59 Years Old	106.25					
Counterproductive Work Behavior	20 - 29 Years Old	96.08	3	2.996	.392	*Accept Ho*	*No Significant Difference*
	30 - 39 Years Old	90.66					
	40 - 49 Years Old	91.91					
	50 - 59 Years Old	62.69					
Overall Performance	20 - 29 Years Old	87.91	3	.956	.812	*Accept Ho*	*No Significant Difference*
	30 - 39 Years Old	93.76					
	40 - 49 Years Old	95.33					
	50 - 59 Years Old	101.75					

Table 17 displays the significant difference between the levels of performance of the staff nurses when they are grouped according to age. The Kruskall-Wallis H test showed that there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to age: a) in terms of task performance as determine by X^2 (3)= 4.231, p = 0.238, with mean rank scores of: 84.47 for 20-29 years old, 99.47 for 30-39 years old, 91.29 for 40-49 years old and 114.81 for 50-59 years old; b) in terms of contextual performance as determine by X^2 (3)= 1.072, p = 0.784 with mean rank scores of: 90.79 for 20-29 years old, 88.76 for 30-39 years old, 95.99 for 40-49 years old and 106.25 for 50-59 years old; c) in terms of counter-productive work behavior as determine by X^2 (3)= 2.996, p = 0.392 with mean rank scores of: 96.08 for 20-29 years old, 90.66 for 30-39 years old, 91.91 for 40-49 years old and 62.69 for 50-59 years old; d) in terms of overall performance as determine by X^2 (3)= 0.956, p = 0.812 with mean rank scores of: 87.91 for 20-29 years old, 93.76 for 30-39 years old, 95.33 for 40-49 years old and 101.75 for 50-59 years old.

The finding above means that age does not affect the level of performance of nurses. This is because the staff nurse-respondents belonged to young

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population; that they have the same enthusiast in work as they are gaining skills in their career as a nurse for now. One implication for this is that, they will become productive nurses even if they have some feeling of burnout at work. This finding is supported by the works of Mrayyan (2008) which said that nurses' career commitment appears to influence job performance and is influenced by the nurses' characteristics and organizational factors in the workplace. Enhancing nurses' career commitment and their job performance should produce positive outcomes for nurses, patients and organizations.

Another reason for the no significant difference finding is the culture of the Filipinos wherein respect and hospitality matters most. Filipino nurses tend to care as long as they can because it is in their nature and hone by their culture of caring. This is supported by the works of Aiken et al (2012) which said that when patients have positive experiences of nursing care, nurses also experience a good and healthy work environment. Also as additional support, the works of Disch (2002) stated that healthy work environment fosters a climate in which nurses are challenged to use their expertise, skills and clinical knowledge in order to provide patients with excellent nursing care.

b) Sex

Table 18 presents the significant difference between the levels of performance of the staff nurses when they are grouped according to sex. The Kruskall-Wallis H test showed that there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to sex: a) in terms of task performance as determine by X^2 (1)= 0.445, p = 0.505, with mean rank scores of: 95.86 for male, and 90.05 for female; b) in terms of contextual performance as determine by X^2 (1)= 0.531, p = 0.466 with mean rank scores of: 87.77 for male, and 93.91 for female; c) in terms of counter-productive work behavior as determine by X^2 (1)= 2.705, p = 0.100 with mean rank scores of: 82.51 for male, and 96.29 for female; d) in terms of overall performance as determine by X^2 (1)= 0.391, p = 0.532 with mean rank scores of: 88.36 for male, and 93.65 for female.

Table 18: Levels of Performance of the Staff Nurses When Grouped According Sex

Level of Performance	Sex	Mean Rank	df	x²	Asymp. Sig.	Decision	Interpretation
Task Performance	Male	95.86	1	.445	.505	*Accept Ho*	*No Significant Difference*
	Female	90.25					
Contextual Performance	Male	87.77	1	.531	.466	*Accept Ho*	*No Significant Difference*
	Female	93.91					
Counter-productive Work Behavior	Male	82.51	1	2.705	.100	*Accept Ho*	*No Significant Difference*
	Female	96.29					
Overall Performance	Male	88.36	1	.391	.532	*Accept Ho*	*No Significant Difference*
	Female	93.65					

The finding above means that sex does not affect the level of performance of nurses. This is because in the new era of nurses, everyone is equal; the division of work is levelled to everyone even if they are male or female. Nowadays, female nurses can also perform what male nurses do and vice versa. This is because most of them are trained well during their undergraduate level and before they are commissioned to their jobs in the hospitals. This finding is similar to the study by Myhren, Ekeberg and Stokland (2013) which reported that there are no differences between genders or due to experience with regard to job satisfaction, job stress, or burnout scores.

c) Marital Status

Table 19: Levels of Performance of the Staff Nurses When Grouped According to Marital Status

Level of Performance	Marital Status	Mean Rank	df	x²	Asymp. Sig.	Decision	Interpretation
Task Performance	Married	91.56	1	.009	.925	*Accept Ho*	*No Significant Difference*
	Single	92.31					
Contextual Performance	Married	89.85	1	.212	.646	*Accept Ho*	*No Significant Difference*
	Single	93.50					
Counter-productive Work Behavior	Married	86.17	1	1.565	.211	*Accept Ho*	*No Significant Difference*
	Single	96.05					
Overall Performance	Married	90.87	1	.058	.809	*Accept Ho*	*No Significant Difference*
	Single	92.79					

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Table 19 displays the significant difference between the levels of performance of the staff nurses when they are grouped according to marital status. The Kruskall-Wallis H test showed that there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to marital status: a) in terms of task performance as determine by X^2 (1)= 0.009, p = 0.925, with mean rank scores of: 91.56 for married, and 92.31 for single; b) in terms of contextual performance as determine by X^2 (1)= 0.212, p = 0.646 with mean rank scores of: 89.85 for married, and 93.50 for single; c) in terms of counter-productive work behavior as determine by X^2 (1)= 1.565, p = 0.211 with mean rank scores of: 86.17 for married, and 96.05 for single; d) in terms of overall performance as determine by X^2 (1)= 0.058, p = 0.809 with mean rank scores of: 90.87 for married, and 92.79 for single. The finding of no significance denotes that marital status does not affect the level of performance of staff nurses. This is because of the hardships of life (high cost of living like food, housing, clothes) that nurses have to endure, that even married or single, they have to perform well in their job so as to be retained in their work and be compensated. Those married nurses have children to feed, to send to school and a house to maintained; same with the single nurse who have parents and siblings to take care of, continuing education to fulfill and bills to pay for the family. These factors relate to the needs of the nurses that made them strive hard to perform well. This finding is contrary to that of the study by Lasebikan and Oyetunde (2013) which reported that although there are number of studies that explored the relations between personal accomplishment and marital status which resulted to minimal, the results were consistent, reporting that unmarried individuals scored lower on personal accomplishment as compared to their married counterparts.

d) Salary

Table 20: Levels of Performance of the Staff Nurses When Grouped According to Salary

Level of Performance	Salary	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Task Performance	10,000-20,000 pesos	83.77	1	1.637	.201	*Accept Ho*	*No Significant Difference*
	More than 20,000 pesos	95.01					
Contextual Performance	10,000-20,000 pesos	95.72	1	.333	.564	*Accept Ho*	*No Significant Difference*
	More than 20,000 pesos	90.64					
Counter-productive Work Behavior	10,000-20,000 pesos	97.54	1	.745	.388	*Accept Ho*	*No Significant Difference*
	More than 20,000 pesos	89.97					
Overall Performance	10,000-20,000 pesos	92.90	1	.019	.890	*Accept Ho*	*No Significant Difference*
	More than 20,000 pesos	91.67					

Table 20 displays the significant difference between the levels of performance of the staff nurses when they are grouped according to salary. The Kruskall-Wallis H test showed that there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to marital status: a) in terms of task performance as determine by X^2 (1)= .1.637, p = 0.201, with mean rank scores of: 83.77 for 10,00-20,000 pesos salary, and 95.01 for more than 20,000 pesos salary; b) in terms of contextual performance as determine by X^2 (1)= 0.333 p = 0.564 with mean rank scores of: 95.72 for 10,00-20,000 pesos salary, and 90.64 for more than 20,000 pesos salary;; c) in terms of counter-productive work behavior as determine by X^2 (1)= 0.745, p = 0.388 with mean rank scores of: 97.54 for 10,00-20,000 pesos salary, and 89.97 for more than 20,000 pesos salary; d) in terms of overall performance as determine by X^2 (1)= 0.019, p = 0.890 with mean rank scores of: 92.90 for 10,00-20,000 pesos salary, and 91.67 for more than 20,000 pesos salary.

The finding of no significance above indicates that salary do not affect the performance of the staff nurse-respondents. The reason for this is similar to that from the no significance of marital status in relationship to level of performance in the sense that most of the nurses nowadays have similar salaries in accordance to their work position. This salary is used to pay the bills and support their family. Therefore, they need to perform well to be compensated enough to make the means for their family. Also, the nature of caring for the nurses is always above of all their characteristics that they care for patients even if their salary is not that high because nursing is caring. They cannot just leave their patients unattended and become frail because their salary is not a match to their workload. This is nurses being resilient. This is confirmed by the works of Earvolino-Ramirez (2007) which reported that resilience is the ability to bounce back or cope successfully despite substantial adversity. Another support is the works of Manzano and Ayala-Calvo (2012) which reported that resilient nurses learn to overcome difficulties and develop better coping mechanisms to address burnout through exposure to difficult working situations and environments.

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e) Work Position

Table 21: Levels of Performance of the Staff Nurses When Grouped According to Work Position

Level of Performance	Work Position	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Task Performance	Nurse 1	88.46	3	.474	.925	*Accept Ho*	*No Significant Difference*
	Nurse 2	93.93					
	Nurse 3	94.87					
	Nurse 4 and Up	90.64					
Contextual Performance	Nurse 1	93.74	3	3.849	.278	*Accept Ho*	*Significant Difference*
	Nurse 2	90.33					
	Nurse 3	81.73					
	Nurse 4 and Up	109.81					
Counter-productive Work Behavior	Nurse 1	91.46	3	.834	.841	*Accept Ho*	*No Significant Difference*
	Nurse 2	92.01					
	Nurse 3	97.47					
	Nurse 4 and Up	84.33					
Overall Performance	Nurse 1	90.57	3	.217	.975	*Accept Ho*	*Significant Difference*
	Nurse 2	92.00					
	Nurse 3	91.50					
	Nurse 4 and Up	96.79					

Table 21 displays the significant difference between the levels of performance of the staff nurses when they are grouped according to work position. The Kruskall-Wallis H test showed that there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to work position: a) in terms of task performance as determineby X^2 (3)= 0.474, p = 0.925, with mean rank scores of: 88.46 for Nurse 1, 93.93 for Nurse 2, 94.87 for Nurse 3 and 90.64 for Nurse 4 and up; b) in terms of contextual performance as determine by X^2 (3)= 3.849 p = 0.278 with mean rank scores of: 93.74 for Nurse 1, 90.33 for Nurse 2, 81.73 for Nurse 3 and 109.81 for Nurse 4 and up; c) in terms of counter-productive work behavior as determine by X^2 (3)= 0.834, p = 0.841 with mean rank scores of: 91.46 for Nurse 1, 92.01 for Nurse 2, 97.47 for Nurse 3 and 84.33 for Nurse 4 and up; d) in terms of overall performance as determine by X^2 (3)= 0.217, p = 0.975 with mean rank scores of: 90.57 for Nurse 1, 92.00 for Nurse 2, 91.50 for Nurse 3 and 96.79 for Nurse 4 and up. These findings indicate that the work position of the staff nurse respondents do not affect their level of performance. The rationale if that most of them have the same work position which is Nurse 2, implying that they accomplished their work almost similarly. Like the previous findings of no significances between age and level of performance, sex and level of performance, marital status and level of performance, salary and level of performance, the finding of no significance between the levels of performance of the staff nurses when they are grouped according to work position indicates that the staff nurse-respondents are truly resilient and they work really hard and committed to perform to the best they could even if they feel burnout; this is because of their commitment as a nurse, that is care and to save lives. Nurses really do have a commitment to the service of mankind which has always been a key concept of professional nursing; as nurses they are willing to make considerable efforts to achieve professional goals, a sacrifice for the love of their career even in any position at work. This made nurses satisfied with their work even if they feel burnout. To support this claim is the works of Lu et al (2007) which found that professional commitment increases nurse job satisfaction.

f) Unit of Practice

Table 22: Levels of Performance of the Staff Nurses When Grouped According Unit of Practice

Level of Performance	Unit of Practice	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Task Performance	General Wards	97.08	2	2.477	.290	*Accept Ho*	*No Significant Difference*
	Special Areas	83.90					
	Other Areas	89.19					
Contextual Performance	General Wards	93.64	2	.595	.743	*Accept Ho*	*No Significant Difference*
	Special Areas	87.92					
	Other Areas	96.72					
Counter-productive Work	General Wards	96.20	2	1.985	.371	*Accept Ho*	*No Significant Difference*
	Special Areas	88.10					

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Behavior	Other Areas	79.06					
Overall Performance	General Wards	97.03	2	2.418	.298	*Accept Ho*	*No Significant Difference*
	Special Areas	83.90					
	Other Areas	89.53					

Table 22 displays the significant difference between the levels of performance of the staff nurses when they are grouped according to unit of practice. The Kruskall-Wallis H test showed that there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to unit of practice: a) in terms of task performance as determine by X^2 (2)= 2.477, p = 0.290, with mean rank scores of: 97.08 for general wards, 83.90 for special areas and 89.19 for other areas; b) in terms of contextual performance as determine by X^2 (2)= 0.595, p = 0.743 with mean rank scores of: 93.64 for general wards, 87.93 for special areas and 96.72 for other areas; c) in terms of counter-productive work behavior as determine by X^2 (2)= 1.985, p = 0.371 with mean rank scores of: 96.20 for general wards, 88.10 for special areas and 79.06 for other areas; d) in terms of overall performance as determine by X^2 (2)= 2.418, p = 0.298 with mean rank scores of: 97.03 for general wards, 83.90 for special areas and 89.53 for other areas. These findings indicate that the unit of practice of the staff nurse respondents does not affect their level of performance. This is because most of the nurses were assigned in the general wards, where patients they attend to do not need close observation and one-to-one care. This makes these nurses have more time to be with the patients they care and to attend to their needs. Their caring commitment can be expressed entirely and patients can have positive outcomes because of this. Since they have same patients almost every day, they can master the tasks they have to perform for them on a daily basis. This makes the work become easier for the nurses. To support this claim is the works of Hahn, Binnewies, Sonnentag and Mojza (2011) which reported that employees can also learn how to better cope with their exhaustion by mastering the activities that are most helpful for recovery from their work-related efforts.

g) Length of Work Experience as a Nurse Practitioner

Table 23: Levels of Performance of the Staff Nurses When Grouped According to Length of Work Experience as a Nurse Practitioner

Level of Performance	Length of Work Experience	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Task Performance	2 - 4 Years	89.39	3	11.087	0.011	*Reject Ho*	*Significant Difference*
	5 - 7 Years	77.94					
	8 - 10 Years	92.61					
	More than 10 Years	115.61					
Contextual Performance	2 - 4 Years	104.01	3	12.810	0.005	*Reject Ho*	*Significant Difference*
	5 - 7 Years	76.03					
	8 - 10 Years	81.31					
	More than 10 Years	108.60					
Counter-productive Work Behavior	2 - 4 Years	96.04	3	1.199	0.753	*Accept Ho*	*No Significant Difference*
	5 - 7 Years	87.53					
	8 - 10 Years	88.11					
	More than 10 Years	96.61					
Overall Performance	2 - 4 Years	97.93	3	15.462	0.001	*Reject Ho*	*Significant Difference*
	5 - 7 Years	73.43					
	8 - 10 Years	85.76					
	More than 10 Years	116.69					

Table 23 displays the significant difference between the levels of performance of the staff nurses when they are grouped according to length of work experience as nurse practitioner. The Kruskall-Wallis H test showed that there were statistically significant differences between the levels of performance of the staff nurses when they are grouped according to length of experience as nurse practitioner: a) in terms of task performance as determine by X^2 (3)= 11.087, p = 0.011, with mean rank scores of: 89.39 for 2-4 years, 77.94 for 5-7 years, 92.61 for 8 – 10 years, and 115.61 for more than 10 years; b) in terms of contextual performance as determine byX^2 (3)= 12.810, p = 0.005 with mean rank scores of: 104.01 for 2-4 years, 76.03 for 5-7 years, 8113 for 8 – 10 years, and 108.60 for more than 10 years; c) in terms of overall performance as determine by X^2 (3)= 15.462, p = 0.001 with mean rank scores of: 97.93 for 2-4 years, 73.43 for 5-7 years, 85.76 for 8 – 10 years, and 116.69 for more than 10 years; however there was no statistically significant difference between the levels of performance of the staff nurses when they are grouped according to length of experience as nurse practitioner: a) in terms of counter-productive work behavior as determine by

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X^2 (3)= 1.199, p = 0.753 with mean rank scores of: 96.04 for 2-4 years, 87.53 for 5-7 years, 88.11 for 8 – 10 years, and 96.61 for more than 10 years. These findings of significant differences between task performance, contextual performance and overall performance with the level of performance of the staff nurse-respondents when grouped according to the length of work experience as a nurse practitioner imply that nurses' experience at work really affects their performance level. The rationale for this is that nurses learn as they progress at work and they become more skilful. The experiences nurses have from day 1 to the present made them become more mature at work and realized things that they should maintain, sustain or replenish/ improve. As nurses mature, they become more proficient or expert in their line of work; their caring practice becomes more intense and results to positive patient outcomes than those they do before. In lieu of this maturity and increase in knowledge, skills and attitude, their personal accomplishment also increases. As nurse as they go on with their work for years, they become mostly values by the person whom they care and cared for. This is supported by the works of Lasebikan and Oyetunde (2013) which reported that age and experience have also been found to be significant and consistent factors; that the older and more experienced an individual is, the higher his scores would be on personal accomplishment.

h) Nurse-Patient Ratio

Table 24: Levels of Performance of the Staff Nurses When Grouped According to Nurse-Patient Ratio

Level of Performance	Nurse-Patient Ratio	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Task Performance	1 Nurse to Below 10 Patients	99.87	3	10.614	0.014	*Reject Ho*	*Significant Difference*
	1 Nurse to 10 - 19 Patients	104.44					
	1 Nurse to 20 to 29 Patients	71.34					
	1 Nurse to 30 to 39 Patients	83.11					
Contextual Performance	1 Nurse to below 10 Patients	97.92	3	1.188	0.756	*Accept Ho*	*No Significant Difference*
	I Nurse to 10 - 19 Patients	90.75					
	1 Nurse to 20 to 29 Patients	89.73					
	1 Nurse to 30 to 39 Patients	86.96					
Counter-productive Work Behavior	1 Nurse to below 10 Patients	83.44	3	2.675	0.444	*Accept Ho*	*No Significant Difference*
	I Nurse to 10 - 19 Patients	92.41					
	1 Nurse to 20 to 29 Patients	97.13					
	1 Nurse to 30 to 39 Patients	99.41					
Overall Performance	1 Nurse to below 10 Patients	96.18	3	3.548	0.315	*Accept Ho*	*No Significant Difference*
	I Nurse to 10 - 19 Patients	99.61					
	1 Nurse to 20 to 29 Patients	80.06					
	1 Nurse to 30 to 39 Patients	86.88					

Table 24 illustrates the significant difference between the levels of performance of the staff nurses when they are grouped according to nurse-patient ratio. The Kruskall-Wallis H test showed that there was a statistically significant difference between the levels of performance of the staff nurses when they are grouped according to nurse-patient ratio: a) in terms of task performance as determine by X^2 (3)= 10.614, p = 0.014, with mean rank scores of: 99.87 for 1 nurse to below 10 patients, 104.44 for 1 nurse to 10-19 patients, 71.34 for 1 nurse to 20-29 patients, and 83.11 for1 nurse to 30-39 patients; however there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to nurse-patient ratio: a) in terms of contextual performance as determine by X^2 (3)= 1.188, p = 0.756 with mean rank scores of: 97.92 for 1 nurse to below 10 patients, 90.75 for 1 nurse to10-19 patients, 89.73 for 1 nurse to 20-29 patients, and 86.96 for1 nurse to 30-39 patients; b) in terms of counter-productive work behavior as determine by X^2 (3) = 2.675, p = 0.444 with mean rank scores of: 83.44 for 1 nurse to below 10 patients, 92.41 for 1 nurse to 10-19 patients, 97.13 for 1 nurse to 20-29 patients, and 99.41 for1 nurse to 30-39 patients; c) in terms of overall performance as determine by X^2 (3)= 3.548, p = 0.315 with mean rank scores of: 96.18 for 1 nurse to below 10 patients, 99.61 for 1 nurse to 10-19 patients, 80.06 for 1 nurse to 20-29 patients, and 86.88 for1 nurse to 30-39 patients;

The finding of the significant difference in the level of performance of staff nurse-respondents as to nurse-patient ratio in terms of task performance means that the staff nurse-respondents have been handling different workloads in the hospitals. These workloads if not balanced between patient needs and nursing staff size can be a predictor for burnout. This can be traced from the fact that more workload need more time to accomplish task. This means that if they have more patients to attend to, they cannot easily perform all their tasks at once of completely do it as compared with those with small number of patients to attend to. This is similar to the finding of Hinno, Partanen and Vehviläinen-

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Julkunen (2012) whish reported that there is a direct relationship between nurses' workload and patient outcomes and nurse-reported quality of care. Since most of them are in the 2 – 4 years length of work experience and mostly Nurse 2, they are still struggling to cope with the demands of their job as a nurse. Heavy workloads or heavy tasks give a great toll on them as they still on the process of learning the art of nursing career.

Another support is to the findings above is the study by Westbrook, Duffield, Li and Creswick (2011) which reported that the time nurses spend with patients is associated with improved patient outcomes, reduced errors, and patient and nurse satisfaction. The authors claimed that the initiatives which are effective in allowing clinicians to shift their time to direct care are likely to produce improvements in health outcomes, and patient and health professionals' satisfaction, which may also impact upon improved staff retention.

i) Census per Area

Table 25: Levels of Performance of the Staff Nurses When Grouped According to Census per Area

Level of Performance	Length of Work Experience	Mean Rank	df	x^2	Asymp. Sig.	Decision	Interpretation
Task Performance	Below 10	99.78	6	21.968	0.001	*Reject Ho*	*Significant Difference*
	10-19	151.90					
	20-29	79.06					
	30-39	79.74					
	40-49	86.23					
	50-59	67.23					
	60 and more	93.09					
Contextual Performance	below 10	96.72	6	2.232	.0897	*Accept Ho*	*No Significant Difference*
	10-19	79.65					
	20-29	82.41					
	30-39	86.166					
	40-49	96.68					
	50-59	87.83					
	60 and more	94.91					
Counter-productive Work Behavior	below 10	84.10	6	30.590	0.000	*Reject Ho*	*Significant Difference*
	10-19	27.95					
	20-29	126.50					
	30-39	93.68					
	40-49	117.70					
	50-59	81.21					
	60 and more	104.24					
Overall Performance	below 10	96.23	6	4.745	0.577	*Accept Ho*	*No Significant Difference*
	10-19	98.80					
	20-29	96.25					
	30-39	84.42					
	40-49	94.85					
	50-59	72.25					
	60 and more	97.24					

Table 25 shows the significant difference between the levels of performance of the staff nurses when they are grouped according to census per area. The Kruskall-Wallis H test showed that there were statistically significant differences between the levels of performance of the staff nurses when they are grouped according to census per area: a) in terms of task performance as determine by X^2 (6)= 21.968, p = 0.001, with mean rank scores of: 99.78 for below 10 patients, 151.90 for 10-19 patients, 79.06 for 20-29 patients, 79.74 for 30-39 patients, 86.23 for 40-49 patients, 67.23 for 50-59 patients and 93.09 for 60 and morepatients; b) in terms of counter-productive work behavior as determine by X^2 (6)= 30.590, p = 0.000 with mean rank scores of: 84.10 for below 10 patients, 27.95 for 10-19 patients, 126.50 for 20-29 patients, 93.68 for 30-39 patients, 117.70 for 40-49 patients, 81.21 for 50-59 patients and 104.24 for 60 and more patients; however there were no statistically significant differences between the levels of performance of the staff nurses when they are grouped according to nurse-patient ratio: a) in terms of contextual performance as determine by X^2 (6)= 2.232, p = 0.897 with mean rank scores of: 96.72 for below 10 patients, 79.66 for 10-19 patients, 82.41 for 20-29 patients, 86.166 for 30-39 patients, 96.68 for 40-49 patients, 87.88 for 50-59 patients and 94.91 for 60 and more patients; b) in terms of overall performance as determine by X^2 (6)= 4.745,

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p = 0.577 with mean rank scores of: 96.23 for below 10 patients, 98.80 for 10-19 patients, 96.25 for 20-29 patients, 84.42 for 30-39 patients, 94.85 for 40-49 patients, 72.25 for 50-59 patients and 97.24 for 60 and more patients.

The finding of the significant differences in the level of performance of staff nurse-respondents when grouped to census per area, in terms of task performance and counter-productive work behavior, implies that the staff nurse-respondents are having a great deal of tasks in the hospital and is manifesting counter-productive work behavior about it that is why they have different level of performances. For some nurses, these tasks maybe too heavy and they cannot just get over it so they would tell anyone that they are having a hard time in the area; for some nurses, these tasks may just be enough for them to accomplish and do not say any negative words against their work or their area of assignment. Work accomplishments by nurses depends on the distribution of tasks given to them; if this matched their capability then it is just enough; however if not, then this will be a burden for them. This finding is supported by previous research reported by Aiken (2001), and that of O'Brien-Pallas, Thomson, Alksnis and Bruce (2001) which provided strong evidence that high nursing workloads at the unit level have a negative impact on patient outcomes and level of performance of nurses. From these studies of nurses, it was shown that higher levels of dissatisfaction and exhaustion are significantly associated with job demands such as high patient to nurse ratios, overtime and increasing patient acuity. As a result, increased workloads and high patient to nurse are resulting in high levels of nurse burnout and dissatisfaction.

Problem 6: Is there a significant relationship between the degree of agreement in relation to job burnout and level of performance of the staff nurses.

Table 26: Significant Relationship between Degrees of Agreement In Relation to Job Burnout and Level of Performance of the Staff Nurses

	N	Spearman Rho	Sig. (2-tailed)	Decision	Interpretation
Disengagement and Overall Performance	183	-.175	.018	*Reject Ho*	*Significant Relationship*
Exhaustion and Overall Performance	183	-.080	.282	*Accept Ho*	*No Significant Relationship*

**. Correlation is significant at the 0.05 level (2-tailed).

Table 26 shows the significant relationship between the degree of agreement in relation to job burnout and level of performance of the staff nurses. Spearman's rank-order correlation shows that there: a) was negative weak correlation between degree of agreement in relation to job burnout – disengagement and overall level of performance of the staff nurses which was statistically significant as determine by rs (183) = -.175, p = .018; b) was no correlation between degree of agreement in relation to job burnout – exhaustion and overall level of performance of the staff nurses as determine by rs (183) = -.080, p = .282. These findings for the negative weak correlation between degree of agreement in relation to job burnout – disengagement and overall level of performance of the staff nurses indicate that when there is an increase in the degree of agreement in relation to burnout, the level of performance of staff nurses will decrease. This finding is true on every organization; such that an employee who is feeling different about his / her work can definitely affect his /her performance in doing their work. One possible explanation for the negative link between burnout and performance was that disengaged employees (staff nurses) lack the concentration needed to perform well, and therefore make more mistakes (like error in medication administration or frequent needle-stick injuries). Additionally, according to Fredrickson (2001) their negative emotions that are characteristic of burnout will narrow the breadth of their thought processing; also it will diminish their focus on new information and impair the quality of their decision-making. This kind of condition can lead to more mistakes in the clinical set-up and negative patient outcomes. More likely the staff nurse will also be called in attention and will be given certain reprimand for what she/he caused especially in terms of caring for their patients. They can be suspended or dismissed if the case was too heavy and caused the life of any of their patient. For the hospital, this will be detrimental and may affect their status as a good provider of service. This is why when they have employees like this; they are referred to the clinic for evaluation and rehabilitation. Process may take time but surely it will make the person engage again and capable of properly handling/ performing tasks once more. This finding is similar to that of Madala et al (2014) which reported that burnout has negative effects on performance. Also similar to that of Swider and Zimmerman (2010) which indicated that burnout is negatively related to performance.

The above finding is also supported by the verbalizations of the staff nurses when they were interviewed as how they think their degree of agreement in relation to burnout relates to their level of performance; that almost all of the participants said yes that they have a relationship.

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One staff nurse said that:

"Definitely. Kasi nawawala yung gana ko magwork pag burnout na ako". ("Definitely. I lose my motivations whenever I feel burnout").

Another one staff nurse expressed:

"Oo, magkaugnay yang dalawa kasi mababa ang performance ko pag hindi maganda ang pakiramdam ko about my work." ("Yes, there is a relationship between the two wherein my performance decreases whenever I feel bad about my work").

One nurse in the other hospital said:

"Oo naman, kasi lagi magkatuwang yan. Mababa ang performance kapag feel mo burnout ka. Wala ka na kasing ganang magwork at ayaw mo na halos pumasok o gumalaw". ("Yes of course, there's a relationship. There is a decrease in performance when you feel burnout. There is no motivations to work as if you don't like to go to work or even move").

Another nurse said:

"Yes it has a relationship. Nobody van work efficiently if they feel stressed or burnout. It affects our mind and body kasi. Kaya we cannot work while we feel that way". (Yes it has a relationship. Nobody van work efficiently if they feel stressed or burnout. It affects our mind and body. That is why we cannot work while we feel that way").

Problem 7: What are the perceived factors leading to job burnout of staff nurses?

Based on the findings of the study, the perceived factors that lead to job burnout of the staff nurses were as follows:

1. Time constraints that after work, nurses tend to need more time in order to relax and feel better; that over time, nurses can become disconnected from work;
2. Feeling of tiredness from heavy workloads, that there are days when nurses feel tired before they arrive at work; after their work, nurses usually feel worn out and weary;
3. Emotional drain, that during work, nurses often feel emotionally drained; sometimes nurses feel sickened by their work tasks; they tend to think less at work and do their job almost mechanically; they talk more and more often about their work in a negative way;

IV. Conclusion

Based on the results of this study, there were significant differences between the degrees of agreement in relation to job burnout of the staff-nurses (disengagement and exhaustion) when they are grouped according to nurse's work profile as to nurse-patient ratio and census per area; while there is no significant differences between the degrees of agreement in relation to job burnout of the staff-nurses (disengagement and exhaustion) when they are grouped according to nurse's personal profile except when group according to age in terms of exhaustion; also, there is a significant difference between the levels of performance of the staff nurses when grouped according to length of work experience as nurse practitioner as to task performance, contextual performance and overall performance; when they are grouped according to nurse-patient ratio as to task performance; when they are grouped according to census per area as task performance and counterproductive work behaviour; lastly, there were significant relationships between the degree of agreement in relation to job burnout (disengagement) and overall level of performance of the staff nurses.

V. Recommendation

It was recommended that staff nurses must become aware of their own sources of job burnouts as it relates to their performance at work; and that hospital administrators should manage efficiently the workloads of their staff nurses in order to prevent burnout.

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8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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